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SURGICAL AND GYNÆCOLOGICAL EXPERIENCES WITH AN EMULSION OF SULFATHIAZOLE

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INTRODUCTION

THE usefulness of the sulfonamides in powder form for local and regional therapy has been established to the satisfaction of the surgical world. More recently attention has been directed to employing these drugs in various solutions and bases.

Early last October (1941) the writers quite independently, but simultaneously, began clinical investigation in this hospital on the use of different types of sulfonamide emulsions. They received the very essential and sympathetic assistance of the hospital pharmacist, Mr. Frank Zahalan (B.Ph., L.Ph.) whose expert technical knowledge has been made constantly available. An emulsion base was at once considered the most suitable vehicle, because, although sulfonamides are known to retain their maximum bacteriostatic action in liquid paraffin, in contrast to other paraffin bases, a simple mixture of these substances will not remain suspended.

Making use of the principle of "curtain drainage" as propounded by Morrison¹ in 1915, and consistently supported by Gurd and McKim,² who gave the technique its name, investigation was carried out with a number of different emulsions of the oil in water type. In this connection certain fundamental available facts were made use of in making up the emulsions. These facts are perhaps best stated in the following extract from a recent editorial in *The Lancet*:³ "The curtain drainage action of bipp depends on the paraffin being liquid; paraffinum molle must not be used, since this will not adhere to the wound walls. This fact must be borne in

mind in preparing other applications for packing wounds. Moreover, Locatelli and Bowden⁴ say that sulfanilamide in an ointment base is inert, but in liquid paraffin its full bacteriostatic action is sustained. Now that local sulfanilamide is being extensively used it seems therefore that liquid paraffin or some oil of like consistency is the rational packing required to obtain both the bacteriostatic action of the sulfanilamide and the curtain drainage." It will also be advisable to recall here the exact meaning of "curtain drainage", as defined by Gurd and McKim² and quoted in the above editorial: "If on a smooth surface such as glass, water is poured it will fill the area and stay. But if oil is poured on the glass first, water then applied will immediately float off. Thus, on the walls of the abscess cavity or incised wound thus oiled, the lymph will not adhere and clot, but will continue to flow, and there will be a continuous discharge of fresh leucocytes and antibacterial products." Having full regard for the above statements a sulfonamide emulsion of the oil in water variety was decided upon.

The next important consideration was to choose the most suitable of the sulfonamides. In deciding this the following factors were taken into consideration, namely; the maximum local bacteriostatic action, the toxicity of the absorbed chemical, and finally, its commercial availability and cost. Sulfathiazole was finally chosen because its local bacteriostatic value has been well established, its solubility in serum has been amply demonstrated, its rate of absorption is relatively slow, and it is thought to be less toxic than sulfanilamide. In any event its slow absorption makes toxic effects less likely. Moreover, sufficient quantities at a reasonable price are available.

* From the services, respectively, of Dr. Fraser B. Gurd, Chief of Surgery, and Dr. A. D. Campbell, Chief of Gynæcology, Montreal General Hospital.

The next point to be dealt with was the concentration of the drug. This was set finally at 5 per cent, which concentration has already been shown by Winer and Strakosch⁵ to have a maximum bacteriostatic effect, and higher concentration becomes unnecessary.

In selecting a suitable base the choice had to be for one which allowed for greatest surface dispersal and thus the most complete local action of the bacteriostatic agent. In this connection the pH of the emulsion had to be considered. After all these points had been satisfactorily settled the following emulsion was evolved:

EMULSION SULFATHIAZOLE 5 PER CENT
(M.G.H. FORMULA)

	percentage
Sulfathiazole (finely powdered)	5
Triethanolamine	2
Distilled water	24
White beeswax	5
Liquid paraffin	64

Before describing the procedure for the preparation of the above mentioned formula, we would like to give a brief description of "triethanolamine" because of its importance in the emulsion.

Triethanolamine, $N(CH_2CH_2OH)_3$, is a synthetic organic chemical, produced along with mono- and diethanolamine by the action of excess concentrated ammonia on ethylene oxide in the cold. It is an almost colourless, hygroscopic, viscid liquid of faintly ammoniacal odour. The specific gravity is 1.13, B.Pt. 277 C. at 150 mm. pressure. As a base its pH value is between 10 and 11. Triethanolamine has proved to be particularly well adapted to the preparation of pharmaceutical as well as technical emulsions. Emulsions made with this chemical are distinguished by their stability and small particle size. This is an invaluable feature where an even spreading or penetrating product is desired. It is also important that these emulsions are nearly neutral in their reaction having a pH of between 7.6 to 8.6.

METHOD OF PREPARATION OF SULFATHIAZOLE
EMULSION

1. Melt the beeswax in the liquid paraffin over a water-bath.
2. Mix the triethanolamine with the distilled water and heat over a low flame.
3. Allow Nos. 1 and 2 to come to approximately the same temperature.
4. Mix the powdered sulfathiazole in the triethanolamine-water solution.
5. Finally add the wax solution to No. 4 and stir vigorously until a creamy emulsion is ob-

tained. Continue stirring until the product is homogeneous and of proper consistency.

We are continuing to give consideration to other emulsion combinations which may be indicated in different regional therapy. Thus, time and experience may effect some further changes in the make-up of the preparation.

Certain rules are considered to be advisable in the use of the emulsion. Briefly stated, these are as follows: (1) It should be used specifically only where curtain drainage is required, or for infected or potentially infected surface wounds. (2) True curtain drainage technique should be meticulously followed when so used. This will be discussed in detail later. (3) There should be due regard for possible toxic systemic action of the sulfathiazole. Therefore, although our own experience has never shown more than a trace in the blood, we consider it advisable, whenever the emulsion is used in large amounts, especially for prolonged periods, that routine blood levels should be done. (N.B.—It may be pointed out that by measuring the amount of emulsion used the quantity of sulfathiazole can be estimated, i.e., 1 oz. of emulsion contains 1.3 gm. of sulfathiazole). (4) In the light of existing knowledge, other chemicals should not be added to sulfathiazole in the emulsion. In particular alcohol should not be used in conjunction with it as it sometimes causes a severe local reaction.

I.

SURGICAL USE OF THE EMULSION

As has already been pointed out this method of treatment may be followed wherever curtain drainage is indicated, e.g., wounds and abscess cavities. It has also been shown clinically to be equally valuable in the treatment of certain classes of burns, and wherever bacteriostatic non-adherent surface dressing may be required. To all intents and purposes the same rationale for the emulsion exists in all the above cases.

CURTAIN DRAINAGE

The ideal preparation for this should allow for slow continuous seepage. To this we have added the bacteriostatic action of sulfathiazole. Thus we are fulfilling the requirements hypothesized by *The Lancet* editorial for improvement in curtain drainage methods. This opens up a large prospective field of therapy by the dual action of the emulsion. To get the best results however, meticulous technique is essential, as pointed out by Gurd and McKim. Packing-gauze impregnated with the emulsion should

be packed tightly into the interstices of the depths of the abscess cavity or wound: and from this point less tightly outwards to the surface so that packing does not act as a cork. Slow continuous drainage with bacteriostatic action is thus provided for. Subsequent superficial drainage dressings may be done at any time, depending on the amount of drainage. At such times it will be noted that the packing should be quite moist, even when it has not yet loosened.

Removal of the packing may be delayed for a considerable number of days, during which time it may be noticed that there is little or no odour. When the packing is removed, if it has been properly placed, it comes away easily and with relatively little discomfort, owing to its softness. This is largely due to the paraffin, and only in part to the secretions. Repacking may be carried out if necessary, or progressively a gauze wick or surface dressing with the emulsion used.

Even when the first pack is removed the wound or cavity is remarkable for its cleanliness and absence of maceration. This permits the surgeon to have adequate information at all times on the progress of healing since there is no undesirable caking or crusting.

To date (January 31, 1942) this technique has been used in twenty-five cases of varied character. These include appendiceal, thenar, palmar, ischio-rectal and other abscesses; carbuncles, osteomyelitis, open amputations, avulsion wounds, chronic ulcers and skin grafts. An illustrative case is appended.

R.D., a male aged 64 was admitted January 14, 1942, with a thenar abscess and suppurative tenosynovitis of the flexor pollicis longus of 10 days' duration. He was a diabetic with 3 plus sugar in the urine, and a blood level of 0.312. An inadequate incision had been made outside on the palmar surface of the thumb from the distal phalanx proximally. Insulin therapy was instituted at once. At operation the existing incision was enlarged, and a second proper drainage incision was made proximal to, and along the line of, the thenar crease. Both incisions opened into a common cavity which was packed with gauze saturated with sulfathiazole emulsion. On the second day after operation a surface dressing was done and drainage found to be adequate. On the fourth day the packing was removed, at which time it was noticeably moist and came away easily. The cavity of the abscess was clean and granulating, and the rest of the wound of healthy appearance and clean. A thin gauze wick saturated with the emulsion was now employed, and this dressing again repeated on the sixth day. The dressings were changed every 48 hours thereafter, using the emulsion and surface gauze only, until the patient left the hospital on January 31st. At this time only two small superficial discharging sinuses remained. It may be noted that blood sugar readings had dropped sharply from the outset, and on discharge the figure was 0.098.

Curtain drainage has been used intra-abdominally in only one case of an appendiceal abscess, with gratifying results. The technique which has been urged by Gurd, was employed in this instance. It is proposed to develop further information in this field.

BURNS

Methods of treatment other than the eschar have been generally advocated in recent years, for all burns of the face, hands, feet, neck, axillary, and perineal areas as well as around joints generally, where restriction of movement is undesirable and the liability to cracking with infection is great (see Wakeley⁷). The use of sulfathiazole emulsion is advocated because it meets with the requirements of flexibility and bacteriostatic action. The emulsion eliminated to a great extent, the danger of the hæmolytic streptococcus, and allows for as early movement as is consistent with pain. This minimizes the risk of joint limitation and cicatrices. The dressings absorb secretions, do not require frequent changes, are soothing, and because they are soft and non-adherent, cause little pain on removal. Moreover, they are relatively odourless and cause minimal bleeding when changed. The progress of healing may be viewed easily as the burned area is clean and free from maceration.

Nineteen cases have been followed to date. Eight were of fairly extensive burns though mainly of the second degree. The balance were of a less extensive nature involving a hand, a foot, etc. Experience to date justifies the comment, that here is a method equally useful for both emergency dressings and subsequent treatment. It does not delay the use of skin grafts. It should be noted, however, that this treatment is not intended to replace eschar and other methods for extensive and severe burns of large areas of the body. Rather it is suggested as supplementary to other methods.

ILLUSTRATIVE CASE

A.D., a female, aged 50, spilled hot tea over her left arm on December 24, 1941. She had no treatment until she came to the out-door clinic on January 2, 1942. At this time, covered by some old clothes, there was a badly infected second and third degree burn involving almost the whole extensor surface of both arm and forearm. It was covered deeply with crusts and debris. The whole area was first mechanically cleaned and then dressed with gauze thoroughly saturated with the emulsion. An outer dressing of dry large gauze-wrapped absorbent was added. She was told to return on January 5th, but did not come back until the 7th, when the burned area was found to be in the following condition: there was a two-inch patch of third degree granulation in the centre of the upper arm area. All the rest of the burned area,

which was of second degree, was completely healed. Further dressings were done with the emulsion on the granulating surface on the 9th and 12th. On the 14th, the whole area was completely healed and the patient discharged.

SUNDRY SURFACE DRESSINGS

In our large out-patient department, where innumerable dressings of this type are carried out daily, the emulsion has already received very extensive use. The method of treatment has received considerable favourable comment from independent observers for rapid healing, cleanliness and general results.

ILLUSTRATIVE CASE

A.S., a male, aged 43, came to the out-patient department on January 4th with a large subcutaneous abscess extending proximally from the dorsal of the right fore-finger onto the hand. The abscess was opened under anaesthesia, considerable pus evacuated, and the wide-open cavity was packed with gauze saturated with the emulsion. The packing was removed on the 4th day and the clean granulating wound received a surface emulsion dressing. Thereafter similar dressings were carried out, arbitrarily, every 2nd or 3rd day, until January 21st when the wound was healed and the patient discharged.

Regarding the frequency of dressings with the emulsion, the opinion is offered that, much longer intervals than 48 hours may be allowed, in view of bacteriostatic action and good drainage. To these may be added lack of odour.

COMMENT

Blood levels have been carried out in a large number of our cases, and have never shown more than a trace of sulfathiazole. Despite this, three characteristic skin rashes have been observed after the 1st, 3rd and 9th week respectively. The first a granulating infected abdominal incisional wound, the second a perianal abscess and the third a chronic osteomyelitis. It should be stated at once that these rashes do not appear to represent high concentration of sulfathiazole in the blood and occur less frequently than when the pure drug is used orally. Dr. Wilson's series showed no rashes, possibly a result of relatively short treatment. It is rational to assume therefore, that the occasional rash no more contraindicates the use of sulfathiazole in emulsion form locally, than the use of the pure drug by mouth. Nevertheless, it is felt that it would be wise to estimate, at least roughly, the amount of the drug used, especially on large areas, and particularly over a considerable period of time. In such cases ordinary clinical caution decrees that blood levels be taken as practised when sulfathiazole is used orally.

Our bacteriological department have also carried out sterility tests on the emulsion with negative results.

CONCLUSIONS

It is felt that the emulsion form of treatment, long recognized in surgical practice for wounds, burns and infections, is admirably suited to the dispersal of sulfathiazole in the required area to its best advantage.

A 5 per cent sulfathiazole emulsion has given satisfactory results, with a minimum risk of toxicity from absorption.

The establishment of curtain drainage where indicated by the employment of an oil in water emulsion of sulfathiazole is considered to be sound surgical therapy.

II.

SULFATHIAZOLE IN GYNÆCOLOGICAL SURGERY

The packing of the vagina following operations on the birth canal is more or less universally practised. In general the purpose of packing is to prevent submucosal oozing, to retain the patency of the vagina, and to reduce the incidence of infection, as blood or debris in the vagina naturally gravitating into the posterior fornix forms an ideal media for subsequent infection.

In the past such packing has been saturated with alcohol and glycerine or with an emulsion of acriflavine. The former, while bacteriicidal is hygroscopic and unfortunately promotes scar tissue in the wall of the canal which is apt to result in a contracture which offers a distressing post-operative problem. The emulsion of acriflavine does not produce such local dehydration but its antiseptic value is rather questionable; on the other hand it is felt that this preparation protects the incision. From the fact that there is no coagulation, the oily solution maintains free drainage and retains the patency of the canal.

FACTORS FAVOURING INFECTION

In vaginal surgery as in surgery generally, one must consider the individual as a whole, as there are many factors which are inimical to primary union. Many of the patients in the group operated upon are between the fifth and the seventh decade, rather debilitated, partly from fads and foibles in diet and partly because they are victims of so-called remedies. These

patients are not particularly good operative risks and their wounds do not tend to heal well as they are suffering from a hypovitaminosis in subclinical form; the incidence of infection in such cases is high.

Disturbances to a lesser or greater degree in thyroid and more particularly in carbohydrate metabolism should be considered in all cases. Our experience has demonstrated that those patients with low basal rates are not so resistant to infection as those with normal rates. This deficiency can readily be corrected. Those with high blood sugar levels are especially prone to become infected, and it is imperative that this clinical finding and its treatment should not be overlooked. Further, regressional changes of a general nature subsequent to the cessation of the function of the organs of reproduction favours the production of senile vaginitis. Such a mucosa in addition to its lowered resistance to invasion actually harbours virulent strains of micro-organisms. The administration of œstrin here in appropriate amounts is therefore an essential factor in the prophylaxis of infection.

Infection in the form of *S. hæmolyticus* is present normally in some 5 per cent or more of all married females. Unfortunately, one cannot detect the virulence of these organisms by studying their morphology or from their behaviour in media. However, it cannot be denied that while a great number of these are relatively inert there is a considerable proportion that becomes exalted following the trauma of operation. In addition there are many other strains frequently present such as the staphylococcus and *B. coli*, while the flagellæ in various forms are present in a large proportion of cases. In view of the foregoing it is apparent that absolute sterilization of the vagina pre-operatively is always problematical, and that no drug as yet has a specific effect on the many families of bacteria found in the vagina.

The recent introduction of the sulfonamides into our surgical armamentarium suggests that a preparation of one of this group might be used with good advantage in vaginal surgery. These drugs in suppository form, when used post-operatively, have left something to be desired in that they rather tend to become consolidated over the line of incision. As drainage is considered so important in post-operative cases an emulsion of sulfathiazole was devised, as already described.

THE EMPLOYMENT OF SULFATHIAZOLE EMULSION

The vagina is packed in much the same way as with acriflavine gauze, namely, the emulsion is applied in a 2-inch packing gauze. Pre-operatively, when a decubitus ulcer is present on the prolapsed cervix or vagina, or when there is evidence of senile vaginitis, the vagina is packed for twenty-four hours and if necessary repacked until the apparent infection has subsided. Post-operatively, the vagina immediately is lightly packed; this is not disturbed for from forty-eight to seventy-two hours. Eighty-three consecutive cases have been thus treated and it would seem that amongst them there were fewer cases with superficial necrosis of the vaginal mucosa along the suture line. In addition, on removal of the packing there was no caking along the suture line as when the sulfathiazole powder was used, nor was the vagina dehydrated. A study of these cases showed that the blood when assayed for sulfathiazole showed, at most, only a trace of the drug. In a great majority of cases there was no evidence in the blood of sulfathiazole. There was no change in the blood chemistry from local application nor were any toxic symptoms observed such as rash, leukopenia, vertigo, nausea or pyrexia.

It should be emphasized that the vagina should be free of alcohol before it is packed with sulfathiazole. The chemical reaction on combining these two liberates what is probably an aniline, which causes local necrosis. This was observed in one case when the damage from necrosis was followed by a local cellulitis which was particularly refractory to treatment.

The use of sulfathiazole emulsion gauze has been extended to other cases with equally promising results. In incomplete abortions where on account of hæmorrhage packing is imperative, the emulsion was freely used. In such cases there did not seem to be any absorption from the uterus and it would seem that the morbidity was slightly lower than one would expect in a similar group packed with non-sulfathiazole emulsion gauze.

In the case of a complete tear the emulsion was applied before the final sutures were closed and the result was excellent. It was felt that sulfathiazole emulsion gauze to pack the rectum following hæmorrhoidectomy might be of value.

CONCLUSIONS

An emulsion of sulfathiazole has been introduced as an adjunct in gynæcological surgery.

The routine of the clinic has been observed on these trials, *viz.*, a diet high in the essential mineral salts and vitamins, proper blood sugar levels and appropriate oestrin therapy.

The effect of the drug probably lies in its early application; post-operative fever due to infection at the operative site has been reduced and healing has not been retarded.

The pack seems ideal for vaginal work in that it does not cake, or dehydrate the vagina; there is no odour from the vagina or the removed pack.

It would seem that the emulsion herein described is safe, no toxicity having been observed either locally or systemically.

The improper preparation of such an emulsion results in clinical failures, and toxic symptoms may be observed. The possible danger of alcohol with any combination of sulfathiazole is stressed.

Our results in a small series of cases have been so encouraging that further trials of the use of sulfathiazole emulsion seem justified.

The authors wish to express their grateful thanks to Drs. Gurd, Campbell and Fleet, for their kind cooperation in the preparation of this report, and to numerous other members of the hospital staff both

attending and intern who have contributed much help in various ways. We would also like to thank the hospital for material used.

REFERENCES

1. MORRISON, R.: *The Oxford War Primer*, Frowde, Hodder & Stoughton, 1918.
2. GURD, F. B. AND MCKIM, L. H.: *Am. J. Surg.*, 1941, 3: 573.
3. Editorial: *The Lancet*, 1941, 2: 429.
4. LOCATELLI, A. M. AND BOWDEN, S.: *Brit. Pharm. J.*, June 1, 1941, p. 25.
5. WINER, L. H. AND STRAKOSCH, E. A.: *J. Am. M. Ass.*, 1942, 118: 221.
6. GURD, F. B.: *Am. J. Surg.*, 1932, N.S. 17: 52.
7. WAKELEY, C. P.: *Surgery of Modern Warfare*, Macmillan, Toronto, part 1, section 1, p. 60, 1940.

RÉSUMÉ

Le sulfathiazole est émulsionné dans une base liquide: 64 pour cent de paraffine liquide; 2 pour cent de triethanolamine; 5 pour cent de cire d'abeille et 24 pour cent d'eau distillée. De tous les sulfamidés c'est le sulfathiazole qui a la plus action bactériolytique locale, la moindre toxicité et qui est le meilleur marché. Il est lentement absorbé. L'émulsion contient 5 pour cent de sulfathiazole. L'émulsion a été utilisée avec succès dans 25 cas de suppurations diverses et dans les brûlures. Le pansement est flexible et l'émulsion s'oppose à la formation de croûtes. En gynécologie, le paquetage vaginal est idéal: il ne déshydrate pas les tissus, n'adhère pas et enlève l'odeur des purulences habituelles. Il faut éviter l'usage de l'alcool qui déterminerait des nécroses locales. L'émulsion au sulfathiazole est le préventif de choix des métrites. JEAN SAUCIER

THE EFFECT OF THE SYNTHETIC HÆMORRHAGIC AGENT, 3,3'-METHYLENEBIS (4-HYDROXYCOUMARIN), IN PROLONGING THE COAGULATION AND PROTHROMBIN TIME IN THE HUMAN SUBJECT*

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THE present report records the effects of a synthetic compound chemically identical with the hæmorrhagic agent of spoiled sweet clover in prolonging the prothrombin and coagulation time in the human. It is presented in support of two recent observations on human subjects.^{1, 2} The cases under study were observed in the Montreal General Hospital.

The material used was a synthetic preparation having the same chemical formula as the hæmorrhagic agent of spoiled sweet clover, the dicoumarin, 3,3'-methylenebis (4-hydroxycoumarin). It was prepared in Montreal† after the manner

described by Link and his associates,^{3 to 7} and possessed the same characteristics.⁸

Preliminary observations had a threefold object, namely, the effect of the synthetic material in prolonging coagulation and prothrombin time in human subjects; the amount of the compound necessary to produce a desirable degree of prolongation of the clotting of blood under certain clinical conditions; and to determine the toxicity of the compound in the human. The compound was given orally in all cases, in standard gelatin capsules. In two cases the effects of blood transfusions, and of vitamin K administration in reducing the elevated prothrombin and coagulation times were noted. The prothrombin time for the blood of patients was calculated by the method devised by Quick and the results reported in seconds (15 to 22

* From the Department of Hæmatology, Montreal General Hospital. Aided in part by the Blanche Hutchinson Research Fund, Faculty of Medicine, McGill University.

† The synthetic material was made available by the generosity of Dr. Grant, of Ayerst, McKenna, and Harrison, Limited.

seconds normal). The coagulation time was obtained by the three-tube method of Lee and White and reported in minutes (8 to 10 minutes normal).

RESULTS

CASE 1

A white male, aged 24, entered hospital with a diagnosis of pleurisy and effusion which was subsequently proved to be of tuberculous origin. He was given 200 mg. of the drug daily for 4 consecutive days, and on the 6th day, 400 mg., all by the oral route. There was little or no change in the coagulation or prothrombin times before 48 hours, when both became prolonged. On the 8th to 10th day the highest level was reached, the coagulation time being 13 minutes and the prothrombin time 10 seconds above normal levels. On the 10th day following the last dose of the dicoumarin compound the blood had returned to normal levels. He received no other medication.

CASE 2

A white female, aged 51, was admitted to the hospital with a diagnosis of thrombophlebitis in the left leg. She received a total dosage of 360 gr. of sulfadiazine before the dicoumarin compound was administered. This patient then received 400 mg. of the drug on the 1st day, followed by 300 mg. daily for three consecutive days, and 500 mg. on the sixth day. This was followed by a prolongation of the prothrombin time to 76 seconds with a corresponding rise in the coagulation time to 26 minutes on the 8th day. In spite of 300 mg. of the drug on the 10th day, there was little change, and by the 15th day the prothrombin time had reached normal levels, although the coagulation time remained slightly elevated. Sulfadiazine was continued for 5 days after the dicoumarin was started and 300 gr. were given in addition to the 360 gr. already mentioned.

CASE 3

This patient, a white male, aged 44, was known to have a positive blood culture for *S. viridans* and was suspected to be a case of subacute bacterial endocarditis. At the time of commencement of this patient on the dicoumarin compound he had already received considerable chemotherapy, the exact amount is not available at the time of writing. This third patient received 300 mg. daily for 4 consecutive days. This resulted in a prolongation of the coagulation time to 30 minutes with a prothrombin time of 30 seconds on the 10th day. Three days after this high level and 6 days after withdrawal of the dicoumarin compound there was a perceptible fall in both determinations of the clotting power of the blood. An additional dose of 500 mg. resulted in a slight prolongation of the clotting values, and normal values were reached on the 8th day following the last dose of the drug. This patient experienced slight nausea on several occasions when the drug was taken on an empty stomach.

CASE 4

A white male, aged 43, was admitted to hospital with thrombophlebitis in the left leg and received heparin therapy for 8 days and chemotherapy with sulfathiazole for 5 days, totalling 225 gr. Prior to the administration of the dicoumarin compound coagulation and prothrombin times were normal. This patient received an initial dose of 500 mg. followed by 300 mg. on three consecutive days, and a dose of 400 mg. on the 5th day. Following this there was a prolongation of the coagulation time to 19 minutes and a marked disturbance of the prothrombin time, 91 seconds. On the 8th day, following withdrawal of the drug, the clotting values returned to normal and further dosage of 400 mg. followed by 300 mg. created a further prolongation of the values. Three hundred milligrams of the drug were vomited im-

mediately after being given on an empty stomach on one occasion. Both sulfathiazole and sulfadiazine were continued along with the hæmorrhagic agent.

CASE 5

The effects of small repeated doses of the hæmorrhagic agent were observed in this case, a Chinese male, aged 66, with carcinoma of the cæcum. Fifty milligrams three times daily for 5 consecutive days produced some prolongation of the prothrombin and coagulation times. After a lapse of 24 hours the patient received 100 mg. daily for 6 consecutive days without any further remarkable disturbance in the clotting power of the blood. Following a blood transfusion there was a gradual decrease in the prothrombin and coagulation times to a normal level on the 8th to 10th days following the transfusion. Normal values were restored even though 500 mg. in divided dosage over four days had been given following transfusion. Synthetic vitamin K substitutes were given during this period in order to ascertain if the prothrombin time could be maintained at a low level.

CASE 6

This patient, a 54-year old female, was admitted to hospital with acute cholecystitis and developed a thrombophlebitis in the right leg about 8 days after admission. She was started on sulfadiazine 2 days before the hæmorrhagic agent was given. The total amount of the sulfadiazine received was 455 gr. The patient was given orally 300 mg. of the dicoumarin compound on four consecutive days. There was a gradual increase of the prothrombin time to 72 seconds with an increase of the coagulation time to 24 minutes. An additional 300 mg. were given on the 8th day following the initial dose with relatively little change in the clotting power of the blood. On the 11th day this dosage was repeated. Four days following the last administration, the prothrombin time had reached 240 seconds and the coagulation time 48 minutes. A mild epistaxis occurred. Owing to an oversight an additional 400 mg. of the drug were given and on the following day the patient became nervous and restless. Two days after the last 400 mg. bleeding from the gums was noted and there was headache and general malaise, the prothrombin time increased to 420 seconds and the coagulation time to 39 minutes. Five hundred c.c. of blood were transfused to the patient but the immediate effects of this on the clotting power of the blood were not noted. On the following day there was pleural pain, râles in the lung and some bloody sputum. The patient appeared flushed, vomited blood tinged vomitus, and bleeding from the gums continued. Mental depression was also a marked feature. The prothrombin time was further prolonged to 480 seconds and reached a maximum of 566 seconds, 6 days after the last dose of the compound. During the height of the elevation of the prothrombin time, gross hæmaturia was noted. Since the evidence of hæmorrhage was alarming and widespread, another transfusion of 500 c.c. was given and 2-methyl-1, 4-naphthoquinone, 1 mg. q.4.h. x 5 daily, were also given by mouth. Following this active treatment there was a progressively rapid fall in both prothrombin and coagulation times to normal levels, and bleeding manifestations gradually disappeared.

DISCUSSION OF THE LITERATURE

It is a well established fact that a hæmorrhagic disease occurs in cattle following the ingestion of spoiled sweet clover, due to a prothrombin deficiency. The correlation of these observations with the treatment of hypoprothrombinæmia by means of vitamin K is also well known.

Since then Link and his co-workers have not only succeeded in obtaining the active hæmor-

rhagic agent from spoiled sweet clover, but have synthesized the compound and demonstrated that the two are identical.^{3 to 7}

This compound has been shown to be a dicoumarin.⁷ In pure state it is optically inactive, has a low solubility in ordinary organic solvents, but soluble in dilute alkalis. This hæmorrhagic agent, $C_{16}H_{12}O_6$ is the dicoumarin 3,3'-methylenebis (4-hydroxycoumarin).

The chemical, physical, and biological properties of the synthetic dicoumarin, and the hæmorrhagic agent of spoiled sweet clover have been shown to be identical.

The dicoumarin has been demonstrated to be effective in prolonging prothrombin and coagulation times in rabbits, dogs, and humans.^{1, 2, 8} The material is effective by mouth, and the di-sodium salt is also active when given intravenously.²

In animals, toxicity has been indicated by listlessness, dyspnoea, tachycardia, fever, and signs, eventually of internal and external hæmorrhage or both, followed by death. Post mortem examination on dogs revealed subcutaneous and intramuscular hæmorrhage, and frequently gross hæmorrhage into the gastrointestinal tract and pleural spaces, and multiple small hæmorrhages in the lungs.

No gross or microscopic lesions have been found in the liver, kidneys, or other organs; occasionally there is a moderate amount of hydropic degeneration of the liver. The most constant feature is an apparent dilatation of capillaries, small arteries and veins in most of the walls of the vessels.²

COMMENT

Reviewing the observations on this group of 6 patients given the dicoumarin compound, 3,3'-methylenebis (4-hydroxycoumarin), certain conclusions can be drawn. All cases showed a prolongation of both the prothrombin and coagulation times. The effects of the drug were not immediate, but required 24 to 72 hours before evidence of delayed clotting of the blood was noted. In all the simple experiments, the effects of the hæmorrhagic agent wore off in 8 to 10 days after withdrawal of the drug.

Three cases showed only a moderate prolongation of the prothrombin and coagulation times, while in two cases the disturbance of the prothrombin time was considerable, and in one case, marked, giving rise to multiple hæmorrhages. In all these cases the method of administration

and dosage of the drug did not vary to any great extent, although the response was variable. The total dosage given seemed to bear little expected relationship to the prolongation of the prothrombin and coagulation times. Certain individuals responded only moderately, whilst an equal number showed a definite prolongation of the prothrombin time, even though the total dosages of the drug were approximately the same. Blood transfusion failed to produce a perceptible decrease in the prolonged prothrombin time, although in Case 5 the values did tend to return to normal following the blood transfusion. However, the hæmorrhagic agent was recommenced after this effect was noted and vitamin K was given to see if normal values could be maintained. There was no further rise in the prothrombin or coagulation times, and it could be concluded that this result was obtained by reason of the vitamin K administration. This is contrary to other observations which have recorded no effect from vitamin K.^{1, 2}

In Case 6 the first blood transfusion failed to show any perceptible effect, except of a subjective nature, but on the other hand, a second transfusion plus vitamin K therapy resulted in an immediate drop of the prothrombin and coagulation times to normal levels, and these normal values were maintained. It is only fair to state however, that normal values occurred 8 to 10 days after the withdrawal of the dicoumarin compound and normal values of the prothrombin and coagulation times might have occurred without the second transfusion and vitamin K.

From our experience with 6 patients who received the drug, it may be said, that, three showed a moderate response to the hæmorrhagic agent, while an equal number demonstrated a more pronounced susceptibility marked by an undesirable prolongation of the prothrombin time. Moreover, satisfactory or undesirable alterations in the coagulability of the blood cannot be predicted in any individual case either before or during treatment. When susceptibility is marked multiple hæmorrhages of a distressing nature may occur. There is no adequate control for this induced hæmorrhagic tendency at the present time. Experiences of others show that transfusion is only of temporary benefit.^{1, 2} Bingham² and his associates, using small dosage of the drug, have noted significant elevations in the prothrombin and coagulation times of the blood in 6 cases. Another 6 cases failed to show

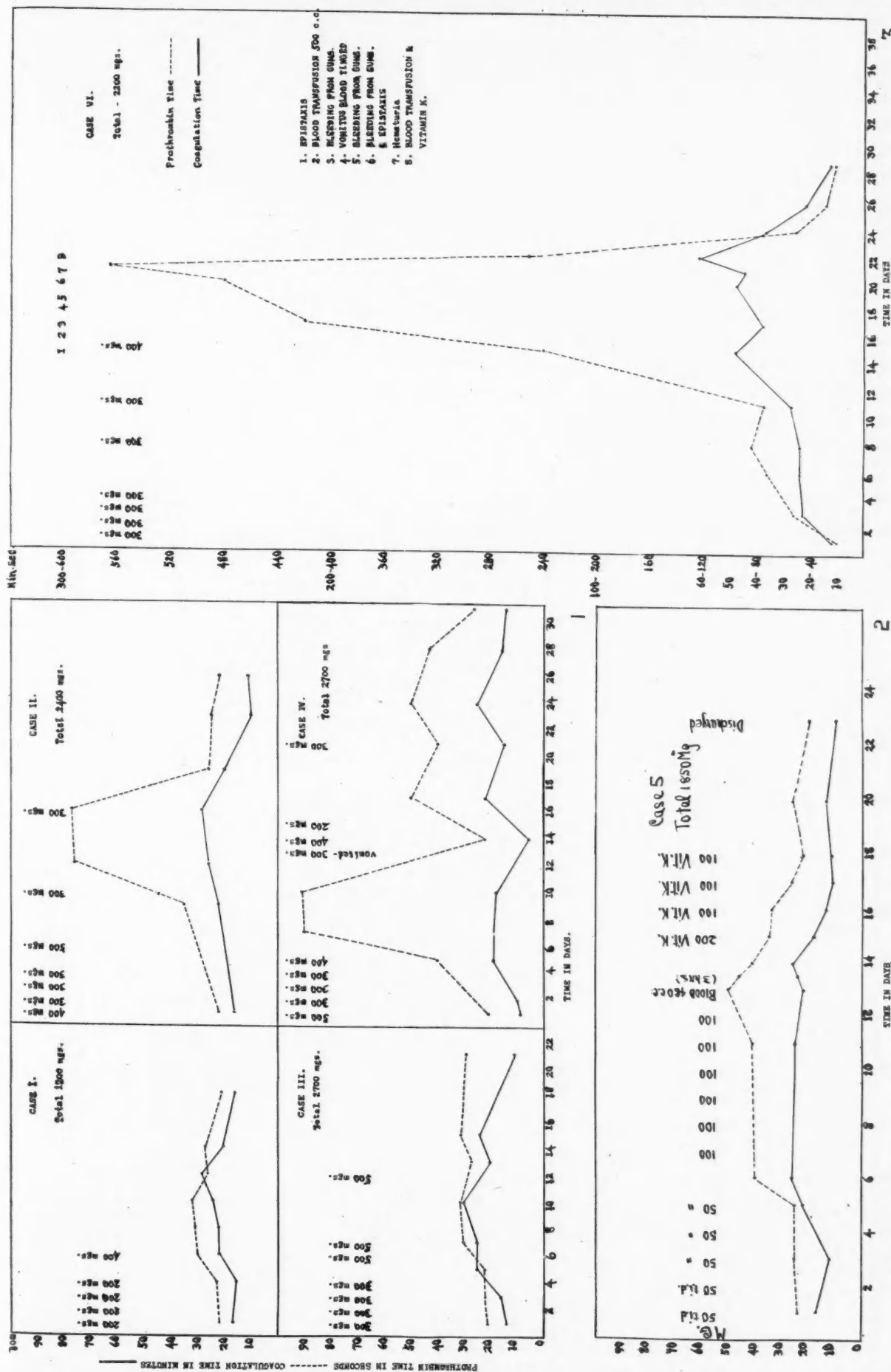


Fig. 1.—The effect of the synthetic hemorrhagic agent on the coagulation and prothrombin times in four human subjects. The charts show the variable response in prothrombin times. This is of particular interest in Cases 3 and 4 where an equivalent total dosage was given. Fig. 2.—The effect on the coagulation and prothrombin times after the oral administration of 1,350 mg. 3,3'-methylenebis (4-hydroxycoumarin) in a human subject. The gradual fall of the coagulability of the blood to normal values following blood transfusion is shown. No apparent effect is demonstrated from an additional dosage of 500 mg. of the drug although this may have been influenced by the vitamin K (synthetic) which was given intramuscularly. Fig. 3.—The undesirable effects of the synthetic hemorrhagic agent were demonstrated in Case 6 in which multiple hemorrhages occurred although only 2,000 mg. of the drug were given orally.

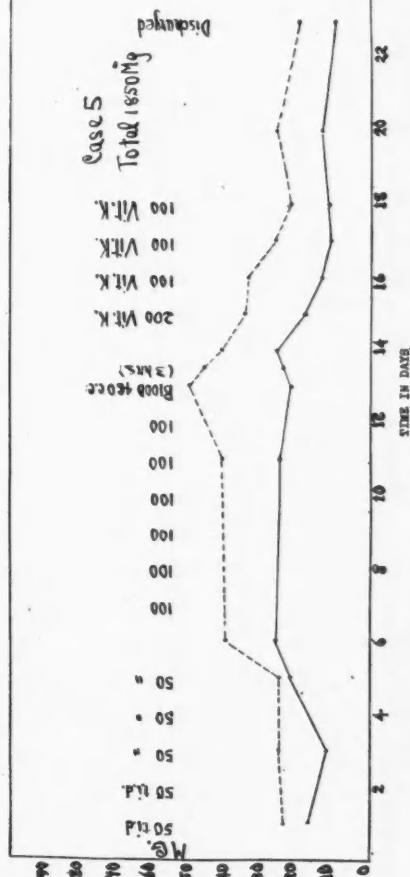


Fig. 2.—The effect of the synthetic hemorrhagic agent on the coagulation and prothrombin times in a human subject. The gradual fall of the coagulability of the blood to normal values following blood transfusion is shown. No apparent effect is demonstrated from an additional dosage of 500 mg. of the drug although this may have been influenced by the vitamin K (synthetic) which was given intramuscularly. Fig. 3.—The undesirable effects of the synthetic hemorrhagic agent were demonstrated in Case 6 in which multiple hemorrhages occurred although only 2,000 mg. of the drug were given orally.

Discharged

any effect. This tends to support our suggestion, that there are individuals who will respond to moderate dosage with only a moderate prolongation of clotting power, while others, upon the same dosage may show a marked prolongation of the prothrombin time, and even hæmorrhage. In rabbits^{5, 6, 7, 8} it has been noted that some animals show no response to the drug, whilst in others the response is definite. Humans may to some extent exhibit the same characteristics when a sufficient number have been studied.

The most effective dosage of the hæmorrhagic agent appears to be 200 to 300 mg. given in repeated dosage. This has been confirmed in part by workers in the Mayo Clinic¹ and suggested by Bingham and his associates.²

Our experience with Case 6 emphasizes that care must be exercised to maintain the prothrombin time within reasonable limits in order to avoid unhappy incidents. The variable results in different individuals on equivalent total dosage suggest that each patient must be considered separately until more is known of the action of the drug, and a greater number of cases have been observed. These observations should be in hospital where frequent estimations of the coagulation and prothrombin times may

be obtained in the intervals between each dose of the drug. In spite of our limited number of cases and the toxic effects exhibited by one, we feel that this dicoumarin compound may prove an effective agent in thrombosis and embolism. The advantages of oral therapy, prolonged effect, and low cost, suggest that at some future period it may well replace heparin. It is our intention to continue investigations on cases with thrombosis, embolism, thrombophlebitis, and other situations where heparin has been used to advantage. Further study certainly seems justifiable.

The patients studied were under the care of members of the medical and surgical staffs of the Montreal General Hospital, to whom the authors are indebted for the privilege of these studies.

We also wish to thank the Misses A. Durrell, J. MacIver and E. Peck for their valuable technical assistance.

REFERENCES

1. BUTT, H. R., ALLEN, E. V. AND BOLLMAN, J. L.: *Proc. Staff Meet. Mayo Clin.*, 1941, 16: 388.
2. BINGHAM, J. B., MEYER, O. O. AND FOHLE, F. J.: *Am. J. M. Sc.*, 1941, 202: 563.
3. CAMPBELL, H. A. AND LINK, K. P.: *J. Biol. Chem.*, 1941, 138: 21.
4. CAMPBELL, H. A., ROBERTS, W. L., SMITH, W. K. AND LINK, K. P.: *J. Biol. Chem.*, 1940, 136: 47.
5. CAMPBELL, H. A., SMITH, W. K., ROBERTS, W. L. AND LINK, K. P.: *J. Biol. Chem.*, 1941, 138: 1.
6. HUEBNER, C. F. AND LINK, K. P.: *J. Biol. Chem.*, 1941, 138: 529.
7. STAHRMANN, M. A., HUEBNER, C. F. AND LINK, K. P.: *J. Biol. Chem.*, 1941, 138: 513.
8. SOUCH, J. K., SCHENKER, V. AND HOLMES, T.: Personal communication, October, 1941.

THE CARE OF PATIENTS WITH BILIARY DISEASE*

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I HAVE chosen as my topic the care of patients with biliary disease, chiefly because it is a common ailment. Undoubtedly headache and "bellyache" constitute the commonest complaints for which patients consult doctors. In those with the latter, biliary disease is often a chief factor, but my discussion of this must be limited, and I shall restrict it tonight to acute and chronic inflammation of the gall bladder with and without stones. Within this group undoubtedly are included two-thirds of our patients with biliary disease.

Gallstones are relatively frequent as a natural phenomenon. Vital statistics show that they exist in 1.5 males and 4.9 females per 100,000 population between the age of 1 and 74.¹ These

figures show that gallstones are three times as common in women as in men. What is more important, the incidence of stone increases with longevity. Thus Fig. 1, representing the figures compiled by Crump,² who made an exhaustive study of 1,000 consecutive autopsies, shows the increasing frequency of stone. At the age of seventy about 50 per cent of all humanity show stones, I might here interpose a word of warning. The finding of stones without symptoms is no reason for surgery. Cholelithiasis is a relatively normal phenomenon. Moreover, this phenomenon will become of greater importance as the years go by, for in Fig. 2 we see plotted the trend of population by broad age classes from 1900 to 1930.³ Note that with each succeeding decade there is a steady increase in the actual number of people in my country living

* Read before the Academy of Medicine, December 2, 1941, Toronto.

over 45 years and even over 65 years. Note the very considerable increase in these groups as calculated for the years to come. Undoubtedly, the doctors whom we are now training should be aware of these trends in population, since their practice will be concerned more with the care of the elderly than is true today. Geriatric surgery will soon assume a major rôle.

rewarded by the fact that in 94 per cent of the patients subjected to cholecystectomy, stones have been found at operation. I again remind you that although cholelithiasis is very common, cholelithiasis without symptoms does not require surgical interference. Beware of temptation. Stones visualized by chance do not necessarily demand removal.

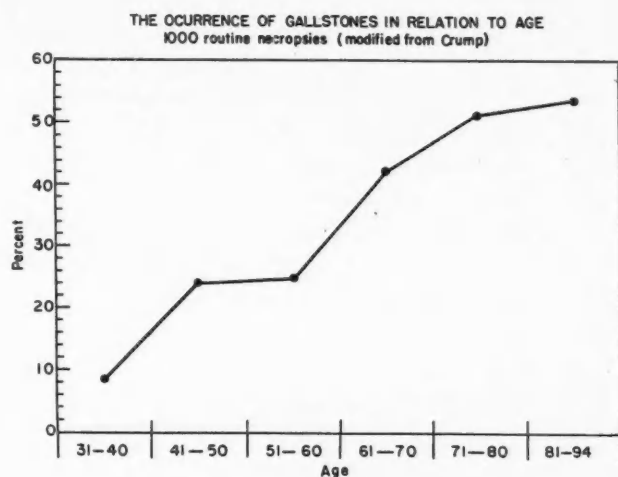
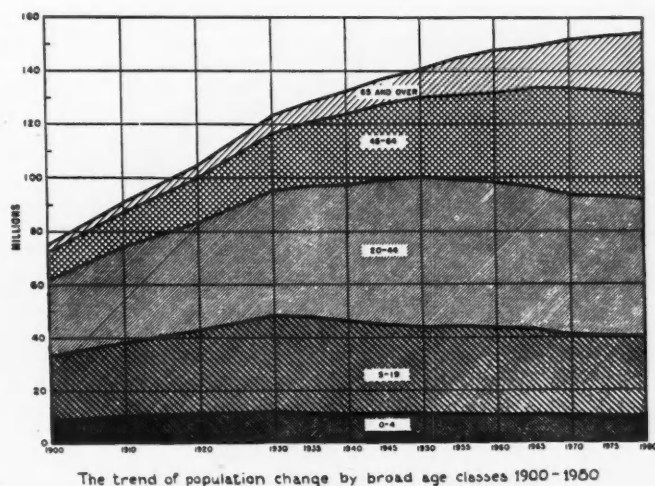


Fig. 1



The trend of population change by broad age classes 1900-1980

Fig. 2

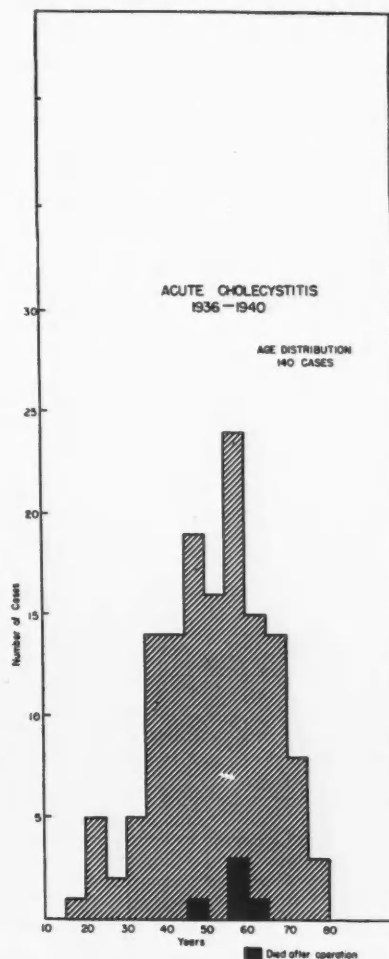


Fig. 3

Fig. 1.—The occurrence of gallstones in relation to age: 1,000 routine necropsies (modified from Crump²). Fig. 2.—The trend of population change by broad age classes, (1900-1980). Reproduced from *The Problems of a Changing Population* (Washington, 1938) by courtesy of the publisher, Government Printing Office. Fig. 3.—Age distribution.

CHRONIC CHOLECYSTITIS

Let us consider the great bulk of the work in this field which falls naturally under the heading, chronic cholecystitis with and without stones. Our records show that approximately 90 per cent of the patients in the Peter Bent Brigham Hospital, Boston, who come to surgery for this disorder, have a history of biliary colic of considerable severity.⁴ This indicates that in general we refuse to operate upon patients with vague indigestion, and our judgment has been

Two-thirds of our patients give a history of pain in the right upper quadrant, referred to the back. Not more than one-third have at any time complained of epigastric distress. In contrast to this, patients with acute cholecystitis or common duct stone usually show epigastric distress, a reference of pain which we have translated as possibly due to pancreatic involvement. Some 10 per cent of our patients have pain in the left upper quadrant or the left infrascapular region. Indeed, because of our

interest in cardiac surgery, patients have been referred to us with left-sided pain and a diagnosis of angina pectoris, whereas study and operation showed cholelithiasis to be the cause of the distress. We are unable from either experimental or clinical studies to explain to our satisfaction the mechanism of left-sided pain, and on the whole do not feel that it can be attributed always to involvement of the pancreas.

Vomiting is not a prominent symptom unless the calculus is located within the major ducts. At one time we made some experimental observations in this field, after inserting little balloons in the gallbladder and extrahepatic bile ducts. We found that when we exerted pressure within these balloons so that the viscera were distended, vomiting was provoked almost always when the balloon lay in one of the extrahepatic ducts, but only rarely when it lay in the gallbladder.

A typical history given by patients with chronic cholecystitis and stone is that of a vague indigestion characterized by gaseous eructations, by a bitter taste in the mouth, and with no specific relation to food, other than the fact that fatty foods produce the pain through stimulation of the flow of bile. Often the indigestion is accompanied by lameness in the back, which is annoying rather than incapacitating. The distress may awaken the patient with an empty stomach. It is upsetting to the patient because he can find no relation between his indigestion and his dietary regimen or his physical activity. Moreover, such a history may extend over years. Its very chronicity becomes an outstanding factor.

A good many of our patients in the Peter Bent Brigham Hospital are submitted to the tetraiodophenolphthalein test, but it will interest you to know that only about one-third of those showing a pathological gallbladder are subsequently submitted to operation. This represents our rigid selection of surgical risks and is in no way critical of our roentgenological department. While I am on this matter of tests, let me comment on the expense of modern medical practice caused in part by physicians and surgeons who require that all known tests be performed until the diagnosis is established. This attitude is often unfortunate. It greatly increases the cost to the public, and in many cases offers no additional information. If a patient has typical attacks of right upper quadrant colic, with periods of jaundice following the

attacks, and has signs of biliary inflammation, his time and money should not be wasted by carrying out the Graham test. To be sure, all tests should be used in difficult cases. There are many cases of associated arthritis of the spine, ulcer, disease of the kidney, or tumour, where every diagnostic procedure should be carried out.

The physical examination of patients with chronic cholecystitis and cholelithiasis is often inconclusive between attacks, except for the general configuration of the patient with stone, a disease most marked in adipose individuals and, as we have seen, in females. This anthropomorphic consideration is known even to students and has real value. The serum diastase may be elevated slightly. The icteric index may show elevation where clinical jaundice cannot be recognized, but on the whole the physical examination is of more importance in gauging the general risk than in reaching the diagnosis.

When we come to a consideration of common duct stone we reach the most important part of the topic under discussion, especially in relation to progress and the better care of our patients. One of the most serious and frequent mistakes the surgeon makes in treating the patient with chronic cholecystitis and cholelithiasis is his failure to search for and remove calculi lodged in the extrahepatic bile ducts. Statistics show that in approximately 20 per cent of all cases of cholecystitis and cholelithiasis a stone is located in the ductal system, other than the cystic duct or the gallbladder. A careful follow-up of our own patients has occasionally revealed the humiliating situation wherein we have had to operate for common duct stone within two years of cholecystectomy. A careful history coupled with the findings at the time of operation would probably have made it certain that the stone lay in the common duct. Spurred on by these data, we have been driven to opening more and more common ducts at the time of the original operation for cholelithiasis.

In the five-year period, 1936-1940, the actual percentage of common ducts opened ranged from 53 to 26 (Table I). In the cases where the common duct was opened, stones were recovered in 37.1 per cent of the patients. It is clear to us that the number of common-duct stones recovered bears a direct relationship to the number of common ducts opened. There seems little question that the incidence of choledochostomy in patients with cholelithiasis

TABLE I.
COMMON DUCT STONE
PETER BENT BRIGHAM HOSPITAL, 1936-1940

	<i>Number of cases</i>	<i>Mortality percentage</i>
Total operations for cholelithiasis.....	468	2.8
Total operations on common duct.....	175	3.4
Cholecystectomy and choledochostomy	152	3.3
Cholecystostomy and choledochostomy	1	..
Choledochostomy.....	22	4.5
Stones recovered at choledochostomy..	75	..
Negative at choledochostomy.....	100	..
Incidence of common duct stone.....	16.0 per cent	
Incidence of common duct stone at choledochostomy.....	37.1 per cent	

should be somewhere between 40 and 50 per cent of all operations for stone. Also note that the mortality from removing the gallbladder and opening the common duct is but little greater than that for simple removal of the gallbladder. When choledochostomy is carried out at a second sitting the mortality percentage is increased. This is partly because choledochostomy with the gallbladder in place is a simpler technical procedure and partly because a subsequent choledochostomy is usually carried out in the presence of jaundice, which adds greatly to the surgical risk. I have long felt that opening a common duct under the proper circumstances adds little to the risk. The details of this we will consider later.

The diagnosis of common duct stone is seldom difficult in the face of jaundice. There are colic, vomiting, frequent chills and fever from the damming-back of material in the liver, and a past history consistent with the diagnosis of cholelithiasis. In 85 per cent of our cases jaundice was noted either at the time of entry or in the history. But we must recognize the fact that small stones lodged in the common duct may not cause jaundice, colic, chills or fever. Such small stones may never totally occlude the duct, so jaundice does not occur. Or larger stones may be lodged in little diverticuli and again permit the free flow of bile. However, colic is usually present, and a careful history will reveal this complaint in at least 90 per cent of the cases of common-duct stone. Moreover, as pointed out previously, if vomiting has been a prominent symptom and the pain has been epigastric rather than right-sided, we are justified in believing that a common duct stone is probably present.

It is of interest to note that in our series common-duct stone occurred nine times in

women to once in men, and the surgeon may justifiably use this statistical evidence. If there be jaundice, then one should invoke Courvoisier's law, and if the gallbladder be small, stone is usually the cause of the jaundice. This, however, is not specific, since patients who have had chronic cholecystitis and therefore have a non-distensible gallbladder may develop obstruction from malignancy later in life.

In this field the level of the blood diastase is of some importance, though it is chiefly valuable immediately after the onset of jaundice, for it quickly falls back to normal. Should the diastase be elevated, it is proper to delay operation until the level becomes normal, which it usually does within three to four days. In the presence of jaundice the bleeding and clotting times must be determined. When the prothrombin time is extended, vitamin K should be given until a normal prothrombin level is found. Now that vitamin K for intravenous use is being supplied, the presence of nausea and vomiting does not interfere with our having the full advantage of this extraordinarily valuable substance. And for the surgeon I should add that something to do with the operation, though whether it be the anaesthesia or the operation itself is not settled, immediately extends the prothrombin time so that vitamin K should be administered to the jaundiced patient during the first week of convalescence. There are of course other means of protecting the jaundiced patient of great importance to the surgeon. In the first place a high carbohydrate intake must be ensured. This can be given intravenously. At the same time, modern investigation has shown that protein is just as important for the liver as sugar. If there be any question of a low blood protein level, protein should be given, even if it can be given only intravenously, in the form of plasma or serum.

The final decision as to whether or not to open the common duct must rest in the surgeon's hands. Fully equipped with the history, he will have to observe each common duct and judge it in relation to the history. Obviously a dilated common duct or a palpable stone within it indicates that the duct should be opened. But many a common duct, long involved with inflammation, may remain small though seriously obstructed by stone. The process here is similar to that occurring in varicose veins. The thickened, sclerosed, and chronically inflamed varicose veins can no

longer dilate. Therefore just because a common duct is small does not mean that it is devoid of stones.

Now let us turn our attention to acute cholecystitis. Here lies a chief source of contention among our colleagues. The followers of one camp believe that all patients should be observed, well supervised, and later should be submitted to surgery. A second camp points out that delay in certain cases would be just as foolish as delay in cases of acute appendicitis, and points to the relatively high mortality rate for acute cholecystitis in comparison with the remainder of biliary surgery as evidence for early intervention.

The diagnosis of acute cholecystitis depends upon the history and physical examination. The early history has been described previously and, as we have seen, stone is usually present. In the acute case, a new symptom-complex begins with the acute inflammation which is superimposed on the other process. The clinical story is that of pain beneath the right costal margin, progressing to local tenderness in this area. This, however, is not always present, and epigastric distress has been quite as common in our patients as right-sided distress. Indeed, as we have described before, pain and tenderness may even be felt in the left upper quadrant, undoubtedly attributable to pancreatic involvement. The pain, when it occurs, differs from preceding attacks in that it is constant and steady and is not colicky in nature.

The physical examination in cases of acute cholecystitis should add a great deal to the diagnosis. Tenderness and spasm are usually present, and were demonstrable at the right costal margin in 60 per cent of our cases, but a palpable mass could be felt in only 32 per cent. The inability of the surgeon to feel the tender enlarged gallbladder may be due to the fact that the liver prevents a sclerosed gallbladder from reaching to the parietal peritoneum. However, leucocytosis and fever will tend to establish the acute inflammatory aspects of any given case.

An analysis of our own material from 1913 to 1936 revealed the seriousness of acute cholecystitis, for we found a total mortality of 11 per cent, thus indicating that acute cholecystitis is almost as serious to the individual as a perforated appendix. Since 1936 we have tried to divide the cases clinically, and believe that we are able to predict into which group

most of the cases will fall. The first group, approximately 40 per cent, will respond promptly to the generally accepted conservative measures, consisting of the intravenous administration of fluids, sedatives, and heat to the abdomen. Patients in this group will respond rapidly, and within 48 hours of admission to the hospital may be submitted to operation without undue risk. A second and larger group, perhaps 50 per cent, fails to respond to this therapy. The vital capacity is greatly reduced through painful respiratory movements. The circulation, therefore, is impaired, and the fever, physical findings, and leucocytosis decrease very slowly. This group tends to go on to a more serious outcome, and because of this we believe that operation should not be delayed beyond the third or fourth day following hospital admission, even if the signs are not greatly abated. Finally, there is a still smaller group in which the leucocytosis and fever increase and the physical findings become more marked, even in the face of the conservative measures. Such patients must be most carefully observed. If no improvement at all occurs with conservative measures and the disorder seems to be progressing, operation is carried out as soon as the fluid balance is adjusted to normal.

Having established this point of view in 1936, we can now examine Table II, our results since

TABLE II.

ACUTE CHOLECYSTITIS
PETER BENT BRIGHAM HOSPITAL, 1936-1940

	Number of cases	Mortality percentage
Total operations	146	3.4
Cholecystectomy	75	..
Cholecystectomy and choledochostomy	49	4.1
Cholecystostomy*	21	14.3
Cholecystostomy and choledochostomy	1	..
Common duct stones recovered	20	
Incidence of common duct stone		13.7 per cent

*Six patients had subsequent removal of gallbladder.

1936. The mortality rate under such a regimen has dropped to 3.4 per cent. But it will be noted that cholecystostomy, which had previously been somewhat disregarded, is carried out more frequently, and indeed may be the operation of choice in the last group of fulminating cases unless perforation has occurred. In this group subsequent cholecystectomy is indicated and in our opinion is better carried out before the patient leaves the hospital, usually at the end of

two to three weeks rather than later, largely because patients will not return to the hospital for this important secondary procedure.

Table III summarizes our general point of

TABLE III.
ADVISED PLAN OF TREATMENT

1. Immediate hospitalization regardless of signs and symptoms.
2. General measures for treatment of acute intraperitoneal inflammation.
3. Frequent evaluation of signs, symptoms and laboratory data.
4. Optimum time for operation, early or delayed, determined by patient's response.
5. Routine management unsatisfactory. Each case an individual surgical problem.
6. Optimum time for operation varies with each patient.

view concerning acute cholecystitis. Note that general measures for the acute inflammation have come first. Frequent study will tend to separate the groups clinically, but the optimum time for operation will depend upon what happens to each individual case. Those which are fulminating tend to become worse and deserve the earliest surgical intervention. The others may have operation later, somewhere between the third and fifth day after admission to the hospital.

Finally in relation to this group, and because we wish to impress upon the younger practitioners and surgeons the importance of geriatric surgery, note the distribution of acute cholecystitis according to age groups (Fig. 3).⁵ See the considerable number of people in the older-age group who were operated upon without any fatalities, and remember the conclusion of your great antecedent, Sir James Paget, who said "Years, indeed, taken alone are a very fallacious mode of reckoning age: it is not the time, but the quantity of a man's past life that we have to reckon . . . The old people that are thin and dry and tough, clear voiced and bright-eyed, with good stomachs and strong wills, muscular and active, are not bad; they bear all but the largest operations very well."

This I hope has covered the major fragments of the diagnosis and preoperative treatment of acute and chronic cholecystitis and cholelithiasis. We have pointed out the increased incidence of stone with age, the chronicity of the indigestion accompanying stone, the great importance of searching for stone in the common duct, and the difficulties of handling the patient with acute cholecystitis. With your permission I shall now go on to some of the technical considerations,

for even those of you who are not surgeons will be interested that your surgical colleagues be careful of your patients.

The chief consideration for safe operation is adequate illumination. Patients about to undergo operation on the biliary tract should be placed in a semi-recumbent position on the operating table, with a break under the costal margin. If the patient stands up somewhat, the weight of the liver will pull this viscus down, and the common duct will be easier to visualize. It is important that the light be so arranged beforehand that it is focussed at the point where the common duct will be visualized. Nothing is so conducive to safety at the operating table as proper illumination of the field.

Each surgeon may use his own incision. I have tried them all. The subcostal incision and the direct transverse incision were used by us for a long time, until we found that the direction of the incision does not help in reducing the postoperative pulmonary complications which follow epigastric surgery. Nor does it prevent the lowering of the vital capacity in this field. Therefore we now use the vertical incision, which is more easily made. When the abdomen is opened, a hæmostat is placed in the fundus of the gallbladder which when lifted exposes the common duct region. The hæmostat should not be placed on the gallbladder until the decision has been made as to whether or not the gallbladder is to be removed lest the wall be injured. Of chief importance is the dissection of the ampulla away from the common duct. Students are likely to get the idea that the cystic duct leads out of a cornucopia-like gallbladder. That is quite wrong. The ampulla usually lies right down against the common duct well below the point of emergence of the gallbladder into the cystic duct, and it must be carefully dissected away from the common duct lest the clamps used on the cystic duct include a portion of the common duct. This is a difficult step in the procedure, but with adequate illumination one which is easily carried out. Remember that if there is traction on the gallbladder and traction on the ampulla, the common duct is angulated up into the field. Therefore visualization of the common duct before applying clamps is the only safeguard. And herein lies a chief danger to our patient.

Let us now consider common modification of the standard technique. Frequently one encounters a large gallbladder which fills the field

and therefore impairs vision. It is unwise to operate in the face of such a dilemma. If such a large gallbladder be found, a trochar should immediately be inserted in order that the contents may be evacuated. A clamp placed where the trochar is inserted will prevent further soiling of the field. Moreover, it is helpful to know what is in the gallbladder, for white bile, *i.e.*, mucus normally secreted by the gallbladder, represents complete obstruction of the cystic duct, information which may be of value as the procedure progresses. I never hesitate to empty any gallbladder which interferes with complete and satisfactory vision.

The next step will be the incision in the fascial and fatty covering of the common duct, which gives a more adequate exposure to the ampulla. Then the cystic duct must be completely isolated from the common duct, so that a clamp can be applied to the cystic duct under full vision without jeopardy to the common duct. When one reaches this point, a decision must be made, as to whether the common duct is to be opened or not. If it is not to be opened, the surgeon should first clamp and divide the cystic duct and then the cystic artery. Remember that many anomalies of the cystic artery are found and blind clamping above the cystic duct may be dangerous, particularly if traction is being exerted on the gallbladder. An attempt should be made to leave some of the loose areolar tissue about the part of the gallbladder removed from the liver bed. This defect should be closed as the dissection progresses upwards, for it is easier to close this defect with the gallbladder partly in place than to go back and close the incision on the under face of the liver when traction on the gallbladder is wanting. Finally, we leave a rubber-covered drain in the renal fossa. Drains may not be necessary, but in a clinic where the young surgeon is being taught the safest and best surgery of the day, we must always err on the side of conservatism.

We must now return to the common duct stone. If choledochostomy is to be performed it is our custom to open the common duct between silk sutures, then to pass a probe to demonstrate the position of the hepatic ducts and the patency of the common duct and ampulla. I use for this a uterine sound, which is malleable and can be suited to any curve. Following this, a small malleable scoop is passed upwards and downwards in an attempt

to secure stones, and then the ducts are well irrigated with warm saline solution. Most gallstones are light in weight and, if dislodged with fluid, will float into the common duct opening. Finally, woven catheters preferably olive-tipped, are passed into the duodenum to test the patency of the sphincter region. When we are satisfied that all stones are removed, the smallest open-ended catheter is sutured pointing upwards into the common duct. A silk suture, taking the smallest possible bite in the edge of the common duct, is tied very tight, so that it will slough through in five to six days, permitting the catheter to be pulled out of the wound.

We use the smallest possible catheter, because it is much less harmful to the common duct, and the duct can be made water tight about the point of the incision. Moreover, it is not our intention to drain considerable bile from patients. In fact, bile is a life-saving material, and patients from whom the surgeon removes much bile will immediately become very ill. If all bile is removed, they will sink off into a lethargy, and eventually die. Drainage of the biliary tract is merely a safety valve, and we keep the collecting bottle at the level of the gallbladder or even higher as time goes on. We secure never more than one to three hundred cubic centimeters of bile in any given day.

I shall not take up your time further with the refinements of surgical technique, for these are only of interest to the surgeon and not to the general practitioner. Transduodenal removal of gallstones must be resorted to at times, and the proper handling of a cholecystostomy or the removal of the gallbladder from the fundus downwards, though less frequently carried out and never ideal procedures, can be left to your surgical colleagues.

The sources of the information that has been presented are various, but in largest part represent the careful and constant following-up of what has happened to patients after a surgical operation. There was a time when all the attention of the surgeon was focussed on technical work—how to do something. Now technical surgery has allowed us to enter all the cavities of the body—even to open up the heart—and matters of technique are secondary to the desirability of the procedure. Is the procedure worth while?

All this tends to emphasize the importance of records and case histories. But to appreciate fully all phases of any problem in medicine, not only must the hospital record be complete but even more important still each patient must be followed for years after discharge from the hospital in order that a fair appraisal of the benefits of any surgical procedure may be made. It is not enough to cut and hope. We know all these procedures can be done. The questions the patient wants to know are, not only what risk do I assume, but what will the result be? In the particular instance of cholelithiasis, he will want to know how often a new stone will form, whether further operation will be necessary, and whether or not the surgeon can be sure that all stones have been removed. Only by the adoption in each hospital of a follow-up system that brings all patients back for observation at regular intervals can this information be had.

A follow-up clinic is an excellent font of education for all the staff; it is essential to mature the young surgeon and will give to medical students a critical sense that will benefit him for all time. No modern hospital can rest satisfied that its responsibilities are well lived up to unless some form of follow-up system is carried out. By this method of analyzing our end-results sound surgical judgment is soon acquired.

We have discussed the intricacies of one of the chief causes of that commonest illness of humanity, "belly ache", an illness which will inevitably constitute a larger share of medical practice in the future than it does today. The most recent statistics of the Metropolitan Life Insurance Company show that the average age of white people in the United States has been lengthened in the last four decades something over 12 years. These procedures for biliary disease are usually operations of choice, *i.e.*, they are not essential to save life, except in a few isolated instances. One cannot tell the family with honesty that if operation is not carried out, death will follow. Our responsibility as surgeons depends a good deal upon the very definition of elective and imperative surgery. If a mother brings you her son with acute appendicitis and refuses operation, you are responsible for seeing to it that that mother, since she has refused your services, gets into the hands of another doctor, who perhaps may be more successful in his arguments than you have

been, for we know that if the appendix perforates, the mortality rate becomes approximately 20 per cent.

Though you cannot produce such statistics to influence patients with chronic cholecystitis and cholelithiasis, you have a right to modify your discussion in relation to the age of the patient. If the person is young and healthy, you should tell the patient of the years of misery ahead and of the likelihood of common duct stone, with its accompanying jaundice and its greatly increased surgical risk. The further along in years the patient is, the less firm one can be in this prognostication. I look back with some personal recrimination upon my advice to my father, who was fifty-six years old when his first attack of biliary colic came upon him, that perhaps operation would not be necessary, only to see him go through six to eight years of misery and eventually have his gallbladder removed. In this personal instance I was at fault, for he was an otherwise healthy person and would have been saved a great deal of suffering had my decision been made in the light of present knowledge. I can only hope that you will use better judgment with your own patients.

REFERENCES

1. DUBLIN, L. I.: Twenty-five Years of Health Progress, New York, Metropolitan Life Insurance Co., 1937.
2. CRUMP, C.: The incidence of gall stones and gall-bladder disease, *Surg., Gyn., & Obst.*, 1931, 53: 447.
3. QUIGLEY, T. B.: Biliary surgery in the aged, *New England J. Med.*, 1939, 221: 970.
4. CUTLER, E. C. AND ZOLLINGER, R.: Surgery of the gall-bladder and extrahepatic bile ducts, *Am. J. Surg.*, 1940, 47: 181.
5. ZOLLINGER, R.: Acute cholecystitis, *New England J. Med.*, 1941, 224: 533.

RÉSUMÉ

Les travaux sur la cholécystite chronique, avec ou sans calculs, sont innombrables. La cholélithiase est un phénomène à peu près normal. Les calculs sont fréquents, mais il ne faut pas opérer une vésicule calculeuse qui ne donne pas de signes alarmants. La douleur à l'hypocondre droit, irradiant dans le dos est très fréquente, alors que c'est l'épigastre qui est douloureux dans les crises aiguës. Les vomissements sont rares sauf dans les calculs des gros canaux extra-hépatiques. Les histoires typiques de cholécystite chronique avec calculs rapportent de vagues indigestions avec éructations, goût amer et absence d'horaire fixe, durant des années. Tous les malades qui ont une vésicule radiologiquement malade ne doivent pas être opérés d'emblée; ce sont les occlusions du cholédoque qu'il faut bien rechercher et pour lesquelles l'opération est indiquée sans hésitation. Le diagnostic de calcul du cholédoque est facilité par la présence de l'ictère, la colique, les frissons et la fièvre, mais ce n'est pas toujours si simple. N'oublions pas que les femmes sont atteintes de calculs de 5 à 10 fois plus souvent que les hommes. La vitamine K est d'une aide précieuse et permet d'opérer avec moins de risque. La décision d'ouvrir le cholédoque est laissée à l'expérience du chirurgien lorsque le calcul est difficile à sentir et que le canal est sclérosé et petit.

La cholécystite aiguë évolue souvent au cours d'une cholécystite calculeuse chronique. La douleur vésicu-

laire s'accompagne souvent d'épigastralgie et parfois d'irradiations à l'hypocondre gauche. La douleur est constante et ne ressemble pas à celle de la colique. La mortalité est de 11 pour cent. Environ 40 pour cent peuvent être traités médicalement pendant 48 heures, puis être opérées sans danger; 50 pour cent ne répondent pas si bien à la préparation pré-opératoire et doivent être opérées après 3 ou 4 jours malgré le risque opératoire; un dernier groupe, dif-

ficilement améliorable médicalement doit être opéré d'urgence.

Le champ opératoire doit être parfaitement éclairé. L'incision varie avec les habitudes du chirurgien. Les grosses vésicules doivent être vidées. La pose des pinces et les dissections doivent être soignées et faites judicieusement. On songera aux anomalies. La technique de la cholécystostomie est décrite. Les malades opérés sont suivis attentivement à l'hôpital et longtemps après leur sortie. JEAN SAUCIER

THE ELECTROCARDIOGRAPHIC RECORDS OF 2,000 R.C.A.F. AIRCREW

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CARDIAC accidents occur most frequently in individuals of the middle and older age groups but a number have been recorded in relatively young men. In many instances no previous indications of the condition have been manifest. Such accidents may occur at any place or at any time, and have occurred to individuals while driving motor cars, transports, buses, etc., with serious consequences.

In commercial or civilian aviation the possibility of an aircrew member, including the pilot, suffering a cardiac accident constitutes an added hazard to flying. It is therefore important that individuals with potential cardiac conditions should not have responsible positions as members of aircrew.

In service flying where high speeds, high rate of acceleration, ascents to high altitudes, and rapid descents, are tactically necessary, it is of even greater importance that aircrew personnel be free from any cardiac condition which might predispose to syncope, angina pectoris, or coronary occlusion. Such an accident may not only render the individual incapable of performing his duty but also endanger the lives of the other members of the crew, and jeopardize the safety of the aircraft as well.

Such considerations were the basis for supplementing the standard medical examination for "Fitness for Flying" with additional procedures including routine electrocardiograms. It was felt also, as a secondary consideration, that the analysis of a large number of electrocardiograms taken on young healthy males would supply much-needed basic information which would advance our knowledge of electrocardiography in relation to general medicine.

The purpose of this paper is to present the data obtained from the gross analysis of the electrocardiograms of the first 2,000 men enlisted

for aircrew duties under the British Commonwealth Air Training Plan.

Most of the standard textbooks on electrocardiology¹⁻⁶ were consulted regarding the accepted normal variations of the various components of the electrocardiographic tracing. The definitions and measurements of these components are summarized as follows:

The P wave is measured along the base from the beginning of the upstroke to the end of the downstroke. It is stated to be upright in all leads, usually smooth, rounded, and showing a summit, but may be notched. The amplitude is less than 2 mm. and the duration is about 0.10 seconds.

The P-R interval is measured from the beginning of the P wave to the beginning of the main ventricular complex, whether it be upright or downwards. In other words the P-R interval may actually, in any given record, be the P-Q interval. The duration is stated to be 0.12 to 0.20 seconds.

The Q wave is the first downward deflection of the main ventricular complex if immediately followed by an upward deflection (R). The amplitude is usually between 1 and 2 mm., but the wave may be absent. Some difference of opinion exists as to the differentiation between the Q wave and the so-called negative R wave.

The R wave is stated to be present in all leads. It is the first upward deflection of the main ventricular complex and may be sharp or notched. The amplitude in Lead I is stated to vary from 1.5 to 12 mm., in Lead II, from 4 to 35 mm., and in Lead III, from 2 to 15 mm.

The S wave is the last downward deflection of the main ventricular complex immediately preceding the S-T segment. The amplitude is stated to be 1 to 6 mm., but the wave may be absent.

The QRS interval is measured from the break in the isoelectric line at the end of the P-R (Q) interval to the return to the isoelectric line after the QRS complex. The interval occupies from 0.08 to 0.10 seconds.

No information is available on normal records showing high or low R-T or S-T take-off in excess of 1 mm. Definite changes have been described following coronary occlusion and infarction.

The R-T or S-T segment is the interval between the end of the QRS complex (the return to the isoelectric) and the beginning of the T wave. It is said to vary from 0.5 to 1.5 mm. above or below the isoelectric line.

The T wave is said to be present always but may be inverted or diphasic in Lead III. Considerable difference of opinion is reported as to the range of amplitude of this wave.

The U wave may be present or absent. If present, it is usually seen in Leads I and II. The amplitude is stated to be about 1 mm.

METHODS AND TECHNIQUE

This study was commenced on April 29, 1940. The subjects were healthy male adults between the ages of 18 and 32, the majority being between 18 and 26 years of age. All had successfully passed the routine medical examination for "Fitness for Flying". Before each record was taken the subject remained at rest for 5 minutes in the recumbent position. A portable Cambridge (English) electrocardiograph was used, recording the 3 standard leads on a single film, each lead of 5 seconds' duration. The deflection of the galvanometer string was standardized before each lead was taken.

For purposes of R.C.A.F. medical records the following arbitrary classification into five groups was agreed upon and the electrocardiograms were categorized accordingly as follows:

Category I.—Textbook normal: P upright and present in all leads, P-R interval between 0.12 and 0.20 seconds, Q present, R present and upright (at least 5 mm.) in all leads, QRS interval between 0.08 and 0.10 seconds, S-T segment isoelectric, T present and upright in all leads.

Category II.—Normal type more frequently seen: P upright and present in all leads, R present and at least 5 mm. in any one lead, no notching or slurring, T present and upright in all leads, all time relationships within normal limits. Q or S may be absent in one or more leads. S-T segment isoelectric.

Category III.—Normal variations. P negative or absent, Q, R or S splintered or notched, R less than 5 mm. in one or two leads, T negative or diphasic in Lead III, S-T elevated or depressed, auricular or ventricular extra systoles.

Category IV.—Doubtful abnormal: Low voltage of R wave in all leads, left or right axis deviation, abnormal

time relationships of wave complexes; i.e., prolonged P-R, prolonged QRS.

Category V.—Definitely abnormal: T wave negative in Lead I, Lead II, or in both, pathological arrhythmias, bundle-branch block.

The above classification was necessarily arbitrary and subject to change as a result of the accumulation of data. It was necessary, however, because of the scarcity of information concerning normal records for such an age-group as we were investigating. The electrocardiograms of the first 2,000 aircrew were categorized as follows:

TABLE I.

Category	Records	Percentage
1.	27	1.35
2.	358	17.9
3.	1,307	65.3
4.	299	14.9
5.	9	0.45

From this analysis it is apparent that the typical "textbook" electrocardiogram is rare. The majority of the records showed variations which necessitated categorization in Group III.

ANALYSIS OF DATA

The following is an analysis of the 2,000 electrocardiograms categorized above. The amplitude of wave complexes was measured to the nearest 0.5 mm. from the top of the base line in positive waves and from the bottom in negative waves, and the time intervals to the nearest 0.02 seconds.

P wave.—In Lead I the P waves were positive in 1,973 records (98.6 per cent), diphasic in 5 (0.25 per cent), negative in 2 (0.1 per cent) and absent in 20 (1 per cent). The P wave was notched in only 13 (0.65 per cent) records which were included in the above figures. In Lead II the P waves were positive in 1,962 records (98.1 per cent), diphasic in 10 (0.5 per cent), negative in 13 (0.65 per cent) and absent in 15 (0.75 per cent) records. The P wave was notched in 34 records (1.7 per cent). In Lead III the P waves were positive in 1,581 records (79.0 per cent), negative in 225 (11.25 per cent), diphasic in 148 (7.4 per cent) and absent in 46 (2.3 per cent). Forty-four (2.2 per cent) of the records showed notched P waves. The number of records with negative or notched P waves was considerably greater than in the other 2 leads (Table II).

P-R interval.—Since the standard of the P-R (PQ) interval is stated to be 0.12 to 0.20 seconds, in this analysis the intervals were grouped as

follows: (a) under 0.12 seconds, (b) between 0.12 and 0.20 seconds, and (c) over 0.20 seconds. In Lead I there were 20 records (1 per cent) in which the P-R interval was less than 0.12 seconds and 14 (0.7 per cent) in which the interval was greater than 0.20 seconds. The remaining 1,946 (or 97.3 per cent) of the records showed a P-R interval in Lead I within the accepted normal limits of 0.12 to 0.20 seconds. In Lead II about the same number 1,949 (97.4 per cent) had P-R intervals within the accepted limits: 5 (0.25 per cent) were less than 0.12 seconds and 31 (1.6 per cent) were greater than 0.20 seconds. In Lead III 1,911 records (95.6 per cent) showed a P-R interval between 0.12 and 0.20 seconds, only 5 (0.25 per cent), less than 0.12 seconds, and 38 (1.9 per cent) in excess of 0.20 seconds (Table III).

TABLE II.

P Wave						P-R Interval		
Lead	Positive	Negative	Diphasic	Notched	Absent	Under 0.12 sec.	0.12 to 0.20 sec.	Over 0.20 sec.
	per-centage	per-centage	per-centage	per-centage	per-centage	per-centage	per-centage	per-centage
I	98.6	0.1	0.25	0.65	1.0	1.0	97.3	0.7
II	98.1	0.65	0.5	1.7	0.75	0.25	97.4	1.6
III	79.0	11.25	7.4	2.2	2.3	0.25	95.6	1.9

Q wave.—The definition of the Q wave as “the first downward deflection of the main ventricular complex if immediately followed by an upward deflection (R)” was accepted. It was measured to the nearest 0.5 mm. In Lead I the Q wave was present in only 530 records (26.5 per cent). The amplitude was greater than 2 mm. in 13 records (0.65 per cent). In Lead II, however, the Q wave was present in 977 records (48.8 per cent). In 69 (3.4 per cent) of these the amplitude was greater than 2 mm. In Lead III, Q was present in 1,131 records (56.5 per cent) of which 148 (7.4 per cent) had an amplitude greater than 2 mm. (Table IV).

R wave.—The specific amplitudes of the R waves in the respective leads have not yet been measured. Amplitudes of less than 5 mm. were recorded as follows: In Lead I, 764 records (38.2 per cent), in Lead II 36 records (1.8 per cent), in Lead III 532 records (26.6 per cent). These figures include a small number of records in which the R wave was absent (Table IV).

S wave.—In Lead I S waves were present in 1,625 records (81.2 per cent) and 444 (22.2 per cent) had an amplitude of more than 3 mm. In

Lead II S was present in a smaller number of instances, 1,471 records (73.5 per cent), 415 (20.7 per cent) having an amplitude in excess of 3 mm. The number of records showing S present in Lead III was smaller than in Leads I or II, 1,046 records (52.3 per cent). Only 192 records (9.6 per cent) showed an amplitude of the S wave in excess of 3 mm. (Table IV).

QRS complex.—In Lead I the QRS complex was splintered in 11 records (0.55 per cent), in Lead II 13 records (0.65 per cent), and in Lead III 266 records (13.37 per cent) (Table IV).

QRS interval.—The QRS intervals were recorded as the widest space measured from the break in the isoelectric line at the beginning of Q (or R) to the return to the isoelectric after the S wave (or R). Only one record of the 2,000 analyzed had a QRS greater than 0.10

TABLE III.

seconds in all 3 leads. One additional record had a QRS in Lead I in excess of 0.10 seconds, but the interval in Leads II and III was less than 0.10 seconds (Table IV).

T wave.—In Lead I the T wave was present in all 2,000 records. In 2 records (0.1 per cent)

TABLE IV.

Q Wave				R Wave	
Lead	Present	Absent	Over 2 mm.	Over 5 mm.	Under 5 mm.
	per-centage	per-centage	per-centage	per-centage	per-centage
I	26.5	73.5	0.65	61.8	38.2
II	48.8	51.1	3.4	98.2	1.8
III	56.5	43.4	7.4	73.4	26.6

S Wave				Q R S	
Lead	Present	Absent	Over 3 mm.	Notched	Greater than 0.1 secs.
	per-centage	per-centage	per-centage	per-centage	per-centage
I	81.2	18.7	22.2	0.55	0.10
II	73.5	26.5	20.7	0.65	0.05
III	52.3	47.7	9.6	13.3	0.05

T I was negative. One of these had positive T II and T III, the other negative T II and T III. In one other record T I was diphasic and T II and T III negative. In Lead II six records (0.3 per cent) showed negative T waves, 4 (0.2 per cent) diphasic T waves and in one record the T wave was absent. In all these records T III was also negative. In Lead III the T waves were negative in a relatively large number of records, 272 (13.6 per cent), diphasic in 266 (or 13.3 per cent) and absent in 37 records (1.85 per cent). Thus, T I was positive in 1,997 records (99.8 per cent), T II positive in 1,989 records (99.4 per cent) but T III positive in only 1,425 records (71.25 per cent). In this preliminary analysis the average amplitude of the T wave was not determined but the total number of records having waves greater than 2 mm. and those less than 2 mm. have been recorded. In Lead I 1,390 (69.5 per cent) had amplitudes greater than 2 mm., in Lead II 1,701 (85.0 per cent) and in Lead III, 774 (38.7 per cent). In Lead III 64 records (3.2 per cent) had negative T waves in excess of 2 mm. (Table V).

U waves.—In many records the presence or absence of a U wave was difficult to determine, particularly in those showing a fast heart rate. In Lead I the U wave was present in 139 records (6.9 per cent), in Lead II 196 (9.8 per cent) and in Lead III only 16 records (0.8 per cent). The presence of the U waves was recorded only in those records which showed a definite rounded wave of low amplitude and relatively long duration consistently following the T wave.

records (0.5 per cent) and ventricular extra systoles in 21 records (1.05 per cent).

Axis deviation.—The definition for left and right axis deviation published by the Criteria Committee of the New York Heart Association⁶ was followed in this analysis.

“Left deviation of the electrical axis of QRS.—The algebraic sum of the QRS deflections is positive in Lead I. It is negative in Lead III or in Leads II and III depending upon whether the degree of left axis deviation is slight or marked”.

“Right deviation of the electrical axis.—The algebraic sum of the initial ventricular deflections in Lead I is negative. In Leads II and III this value may be positive, negative in Lead II and positive in Lead III or negative in both depending on the degree of right axis deviation.”

It should be pointed out that when axis deviation is determined by use of the Einthoven triangle, as described by White and others, the number of records classed as left axis deviation is somewhat less than when the above standards are used.

There were 299 records (or 14.5 per cent) in category IV, the doubtful abnormal group. Axis deviations constituted 84 per cent of this group, 251 records (12.5 per cent of the series). There were 138 records (6.9 per cent) which showed left axis deviation and 113 (5.6 per cent) which showed right axis deviation. Most clinicians are of the opinion that axis deviation is of no significance in this age group unless associated with

TABLE V.

Lead	T Wave						U Wave
	Positive	Negative	Diphasic	Absent	Greater than +2 mm.	Greater than -2 mm.	Present
	percentage	percentage	percentage	percentage	percentage	percentage	percentage
I	99.85	0.10	0.05	0	69.50	0	6.95
II	99.45	0.30	0.20	0.05	85.05	0	9.80
III	71.25	13.60	13.30	1.85	33.70	3.20	0.80

Extra systoles.—One record of pulsus bigeminus was found. This individual was a strong healthy athlete of 21 years of age. The condition had been present and known for many years.

The recording of isolated extra systoles was largely a matter of accident. However, they were observed in 31 records (1.55 per cent). Auricular extra systoles were found in 10

other signs of heart disease. No cardiac abnormalities were detected in the routine physical examination of the group investigated. However, a further study is being made to determine possible correlation with the so-called functional murmurs, body build, etc., or with changes in the T1/T3 ratio. The results will be presented in a later paper. Records have already been obtained with the individuals in the recumbent

position during quiet respiration, in the expiratory phase and in inspiratory phase; in the sitting position in the various phases of respiration, in the sitting and recumbent position after mild and moderate exercises, etc. The results of this study will also be presented at a later date.

Nine records were placed in Category 5, because of negative T1 or T2 or bundle branch block. The records of the routine medical examination of these men revealed no other abnormal finding, nor did those whose records showed prolonged PR or QRS intervals or diphasic T1 or T2. In a few of these cases a more careful clinical examination and inquiry into the history revealed the presence of some degree of organic cardiac abnormality. These men were not permitted to proceed to flying training. However, those men, who after an additional thorough clinical examination and history, showed no indication of an organic disturbance, other than that found in their electrocardiogram, were allowed to continue in aircrew.

SUMMARY

The gross analysis of the electrocardiograms of 2,000 healthy male adults between the ages of 18 and 32 taken while at rest in the recumbent position has been presented. It is fully appreciated that the value of electrocardiography in diagnosing cardiac conditions is limited. However, the number of records showing axis deviation, abnormalities of the T wave in Leads I and II, and the occurrence of prolonged P-R and QRS intervals, indicate the value of such recordings at least as an indication for more careful investigation before selection for aircrew duties.

REFERENCES

1. WHITE, P. D.: *Heart Disease*, Macmillan, New York, Toronto, 1934.
2. MASTER, A. M.: *The Electrocardiogram and X-ray Configuration of the Heart*, Lea & Febiger, Philadelphia, 1939.
3. LEWIS, T.: *The Mechanism and Graphic Representation of the Heart Beat*, Shaw & Sons, London, 1920.
4. LEWIS, T.: *Clinical Electrocardiography*, 6th Ed., Shaw & Sons, London, 1937.
5. WRIGHT, S.: *Applied Physiology*, 6th Ed., Oxford University Press, 1934.
6. The Criteria Committee of the New York Heart Association: *Nomenclature and Criteria for Diagnosis of Diseases of the Heart*, 4th Ed., New York Tuberculous and Health Association, Incorporated, Little & Ives, New York, 1940.

AN IMPROVED RADICAL TECHNIQUE FOR CARCINOMA OF THE EXTERNAL GENITALIA IN THE FEMALE*

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Toronto

CARCINOMA of the external genitalia, as a rule, occurs in the elderly. It is not a common disease. The affection first appears as an indurated nodule, wart, or ulcer, and in over 50 per cent of cases is preceded by leucoplakic changes in the vulva. In the treatment of this form of cancer the demands of the pathologist are only satisfied when the surgeon removes the primary growth and the lymph glands that drain that area.

The lymphatic drainage of the external genitals is quite rich. The anastomosis across the mid line is very free so that a unilateral lesion can easily infect the glands in both inguinal areas.

There are two groups of inguinal glands; a superficial and a deep. The superficial nodes lie immediately below Poupart's ligament, and number ten to twenty. There are one or two especially large ones over the fossa ovalis. The vulva drains into this group of glands.

The deep glands lie medial to the femoral

vein and are commonly known as the "glands of Cloquet". They drain the superficial group, the clitoris, and the urethra. These glands, situated as they are in the femoral ring, are frequently inaccessible. We owe to Basset the unique suggestion of dividing Poupart's ligament for the exposure and removal of these glands. The exposure is excellent, but the restoration afterwards of Poupart's ligament is difficult.

If the patient is thin, the superficial nodes can be felt. In the obese individual they lie incorporated in meshes of fat so that in their surgical removal it is essential that the entire "mass of fat" be removed. This "mass of fat" resembles the letter "T", the horizontal part being that lying below Poupart's ligament; the vertical part that over the saphenous opening.

Most women with cancer of the vulva are poor risks. A lone lesion may easily infect both sides, so it is important that both groins be operated upon. An operative technique devised for rapidity of action and directness of approach is presented in the following series of illustrations.

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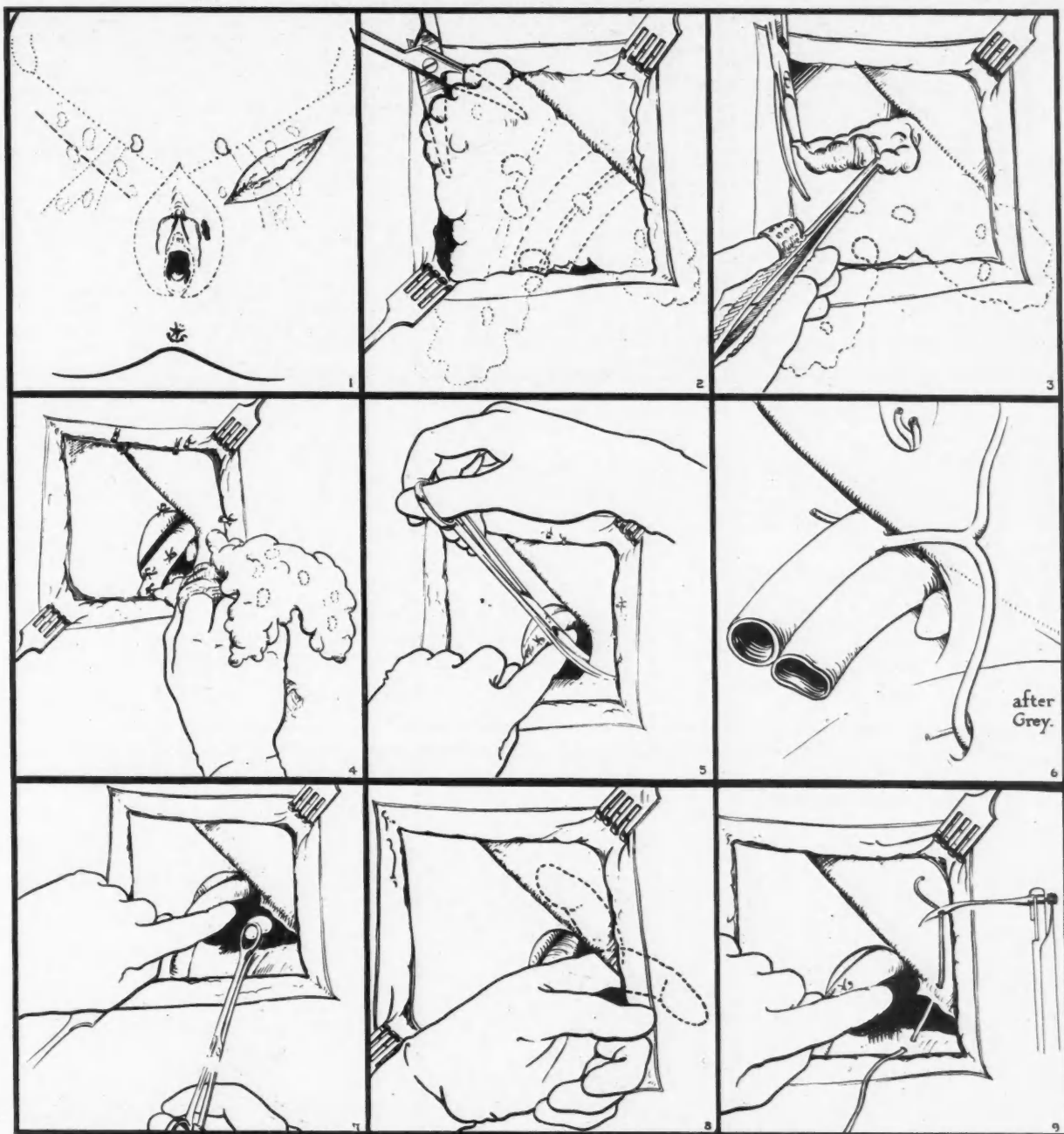


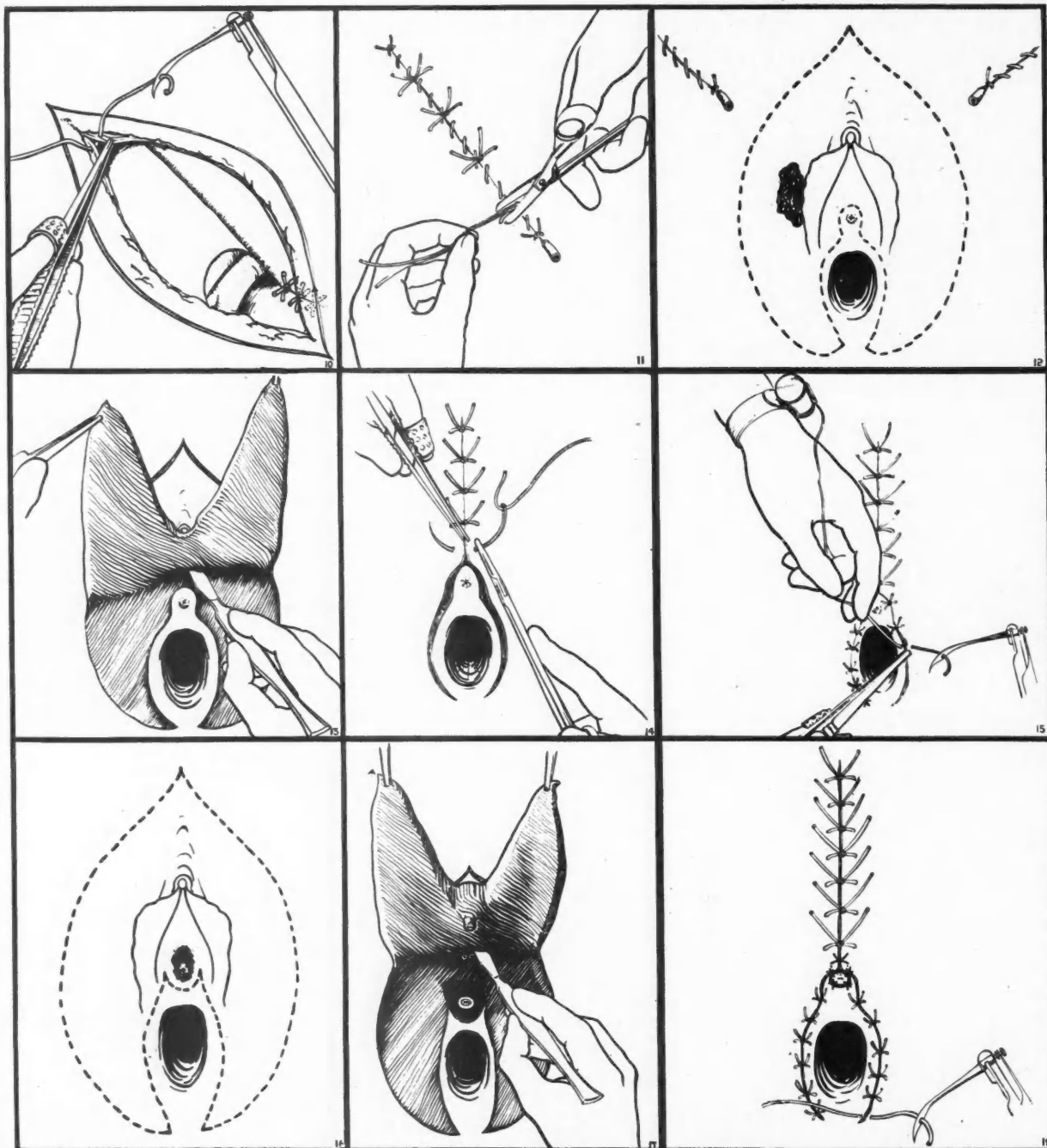
Fig. 1. The Attack.—An incision is made 1 to $\frac{1}{2}$ " below Poupart's ligament. It extends from a point below the pubic spine to almost as far as the anterior iliac spine. Its relation to the great vessels can be seen. The numerous lymph nodes are visualized. Deep to Poupart's ligament and medial to the femoral vein are the glands of Cloquet. The dotted line on the right groin delineates the incision. On the left, the incision has been made. The dotted lines surrounding the vulva indicate the incision necessary for its removal. The cancerous growth is depicted on the left labia. If leucoplakia is present, the skin in the perineum is widely excised.

Fig. 2. Identifying the "Mass of Fat".—The skin is dissected back and retracted. A "mass of fat" will be seen in the groin adherent to the abdominal fascia above and the fascia lata of the thigh below, with curved scissors this mass is raised from its bed. It is densely adherent to Poupart's ligament.

Fig. 3. Raising the "Mass of Fat" Containing the Inguinal Glands.—The fatty layer has been dissected off the deep abdominal fascia and Poupart's ligament.

The dissection is being carried downwards over the fascia lata. As the layer is raised from its bed and the dissection carried inwards, due care must be taken to avoid injuring the saphenous vein. A small vessel penetrating the fascia lata usually requires ligaturing.

Fig. 4. Evacuating the Saphenous Opening.—As the "mass of fat" containing the superficial inguinal glands is drawn inwards the saphenous opening comes into view. It is cleared of all fat and glands. The gauze covered finger is much safer for this part of the work. It is essential that the entire mass of fat be removed as far as the symphysis. Then the edges of the inner part of the incision are undercut so as to remove the areolar and fatty tissue of the outer part of the vulva. Numerous small glands are present in this area. The mass of fat has the appearance of the letter "T", the horizontal part of the "T" being the tissue occupying the area above and below Poupart's ligament; the vertical part of the "T" being the tissue along the saphenous vein. The following small vessels will require ligaturing, the superficial epigastric artery and vein, the superficial circumflex iliac, and the external pudic vessels. The



great saphenous vein should always be divided. The dissection is easier and more thorough if this is done.

Fig. 5. Incising Gimbernat's Ligament.—With the pulp of the index finger of the left hand protecting the femoral vein and gently displacing it outwards Gimbernat's ligament is widely and boldly incised. A curved pair of scissors as shown is the best instrument to use. This procedure gives adequate exposure for the removal of the glands of Cloquet (deep inguinal glands) and is much less destructive than incising Poupart's ligament.

Fig. 6. The Abnormal Obturator Artery.—This diagram taken from Gray's Anatomy is sufficiently descriptive.

Fig. 7. Removing the Glands of Cloquet.—These deep inguinal glands lie to the median side of the femoral vein. Their removal is made easy after Gimbernat's ligament has been incised. The finger or a ring forcep is the best instrument to use.

Fig. 8. Exploring the Inguinal Canal.—Rarely if ever are glands found in the inguinal canal. An incon-

stant node is occasionally found where the round ligament enters the inguinal canal. This area can be easily explored with the examining finger. Furthermore, the loose peritoneum covering the great vessels can be safely displaced upwards and glands for the distance of one's finger can be freed and with a ring forcep removed.

Fig. 9. Repairing the Femoral Ring.—The boundaries of the femoral ring are, the femoral vein externally, Poupart's ligament anteriorly, Cooper's ligament posteriorly, and Gimbernat's ligament internally. The latter has been divided by an incision directed inwards. In repairing the breach, several of the surrounding structures are utilized. On the surface of the pubes is the ileo-pectineal ligament (Cooper's ligament). This white glistening membrane is sutured to Poupart's ligament. The upper fibres of Gimbernat's ligament shrink upwards and are difficult to locate. Three or four sutures usually suffice to close the breach. In placing the first suture the femoral vein is in risk of being damaged. It should be remembered that undue pressure

upon the femoral vein may cause stasis of the blood and predispose to thrombosis in that vessel.

Fig. 10. Suturing the Fascia.—Three interrupted sutures have closed the femoral ring. A few interrupted sutures are necessary to bring together the deep fascia.

Fig. 11. Closing the Skin Wound.—A continuous black silk suture, together with four or five interrupted sutures of the same material close the wound. A small tube is inserted at the inner end of the wound. The secretions are always copious. A similar procedure is carried out on the opposite groin.

Fig. 12. The Excision of the Vulva.—The patient is now placed in the lithotomy position. Two oval incisions are made—an outer, and an inner. The dotted lines in the drawing depict them, and are sufficiently descriptive.

The inner is made first. It practically encircles the vagina, leaving *in situ* a goodly amount of peri-urethral mucous membrane. The inner and outer incisions meet at the fourchette, leaving a small bridge of tissue in the perineum. If leucoplakia is present the skin in the perineum is widely excised.

Fig. 13. Removing the Vulva.—Two Kocher forceps are applied to the lower flaps of the tissue and drawn forwards. The labia majora, minora, the vestibule, the clitoris and the Mons Veneris are removed. The hæmorrhage is always free. The dorsal artery to the clitoris should be firmly ligatured. The oozing areas are oversewn with fine plain catgut.

Fig. 14. Beginning the Closure of the Wound: Introducing Silk Worm Gut Sutures.—Five or six sutures are necessary to approximate the skin edges above the urethral orifice. They should be passed far back from the skin edge, otherwise they "cut out" from pressure. If the wound cannot be closed after undercutting the edges, a few relaxing incisions in the surrounding skin will relieve the tension.

Fig. 15. Completing the Closure.—A few interrupted catgut sutures (chromic No. 1) complete the approximation of the skin and vaginal mucosa. The sutures in the immediate vicinity of the urethra need careful placing.

Sloughing with consequent scar formation distorts the urethral tube—a serious sequela. A self retaining catheter is inserted for seven days.

Fig. 16. The Excision of the Vulva when the Urethral Orifice is Involved, Delineating the Area.—The outer incision is the same as described in Fig. 12. The inner incision partially encircles the urethra. With a little ingenuity on the part of the surgeon, enough mucous membrane may be preserved to facilitate the fashioning later of a new urethral orifice.

Fig. 17. Excising the Vulva and the Lower Half of the Urethral Tube.—The dissection is much the same as Fig. 13. The urethra is incised in its middle third. The greater part of the urethral tube together with the fatty and fibromuscular tissue surrounding it is removed. Hæmorrhage is free. The erectile tissue spaces pour blood. The numerous vessels of the vestibule, and the dorsal artery of the clitoris require ligaturing. Oozing areas are oversewn with fine catgut. The sphincter urethræ muscle is intact. Incontinence will not follow.

Fig. 18. Closing the Wound and Fashioning the New Urethral Orifice.—The mucous membrane that was preserved (see Fig. 16) is wrapped around the incised urethra to form a new orifice. Black silk is used. Relaxing incisions are sometimes necessary.

SUMMARY

An operation for malignant disease of the external genitalia is presented, featuring the removal of a "T" shaped mass of fat which harbours the superficial group of inguinal glands, together with the division of Gimbernat's ligament for the exposure and removal of the deep inguinal nodes, the glands of Cloquet.

The writer wishes to acknowledge his gratitude to Professor William Boyd for his interest and helpful suggestions.

ATRIO-VENTRICULAR NODAL PAROXYSMAL TACHYCARDIA IN AN INFANT TREATED WITH ACETYL BETA METHYLCHOLINE*

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WHEN we were confronted with the problem of treating an infant, aged one month, who was suffering from paroxysmal tachycardia and chose to use acetyl beta methylcholine, we had no knowledge of any similar case. Five milligrams, a fifth of the average adult dose,¹ was chosen arbitrarily as the amount to be given. Subsequently, a thorough search of the literature revealed no report of the use of this substance in the treatment of paroxysmal tachycardia in infants. Our experience therefore seems to merit recording.

CASE REPORT

Arthur C., born at full term of healthy parents on April 6, 1936; weight at birth 8 lb.; a rather pale, quiet baby until May 3, 1936, when his mother ob-

served that he was bluish and cold all over the body and that he moaned during the night. On May 4th, in the morning, a physician found him normal in all respects. On May 5th he was again bluish and cold; on this occasion his mother noticed very rapid heart action. One of us (A.G.) saw him at home at ten o'clock that morning, counted the heart rate at about 220 per minute, noticed patchy cyanosis and coldness of skin, and had the infant admitted to the Montreal Jewish Hospital at 11 a.m. The electrocardiogram recorded at 11.15 a.m. revealed normal sino-auricular rhythm, rate 120, although the baby looked very ill and presented the cyanosis and coldness observed during tachycardia; body temperature was 94, physical examination revealed no sign of inflammation anywhere; the abdomen was rather distended; the liver edge was felt 6 cm. below the costal border in the midclavicular line. X-ray examination of chest showed no abnormalities; hæmoglobin 68 per cent; white cells 8,000; urine showed a faint trace of albumin, a few pus cells but no clumps. After several hours of treatment which included application of heat (a baker), the infant appeared normal, temperature 99.4 degrees F., pulse 144. He remained in this apparently good condition until, at 8 p.m., the routine hourly observation of heart rate revealed that paroxysmal

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tachycardia had recurred and the baby's skin was somewhat cool and clammy. At 9.40 p.m., the electrocardiogram revealed atrio-ventricular nodal tachycardia, rate 300 to 333 per minute. Repeated vagus stimulation by eyeball and carotid sinus pressure caused no change in heart rate or rhythm. At 9.50 p.m., a dose of five milligrams of acetyl beta methylcholine in 0.5 c.c. sterile water was injected subcutaneously. Within the first minute after this, flushing of face and neck, quite profuse salivation, and considerable restlessness of the infant began and lasted for about ten minutes, then 1/600 grain atropine sulphate was administered and the effects of this seemed to stop these phenomena. The infant appeared to be generally normal in all respects but tachycardia persisted.

At 10.20 p.m. a dose of ten milligrams of acetyl beta methylcholine in 0.5 c.c. sterile water was injected subcutaneously, but this caused no apparent effect. Between 10.32 and 10.35 p.m. he was fed three ounces of breast milk; it was hoped that swallowing or vomiting might cause a change in rhythm but this did not occur. At 10.40 p.m. a third dose, five milligrams of acetyl beta methylcholine, was given but this also produced no constitutional reaction and the tachycardia persisted. Similar negative results followed a fourth injection of five milligrams at 10.55 p.m. Forty minutes later a dose of three minims of adrenalin was administered subcutaneously, but this also had no effect on cardiac rhythm, and caused no general reaction.

The observations were continued over a period of four hours during which the child appeared normal in colour, body temperature and general behaviour. He did not vomit after feeding. He slept well during the night and when seen at 9.30 a.m. on May 6th, thirteen and a half hours after onset of the tachycardia, he showed none of the cyanosis and coldness observed during the previous attack, although the heart had continued to beat at 300 per minute all night. An attempt to measure blood pressure by the usual auscultatory method failed because no sounds could be detected over the brachial artery; by palpation of brachial artery pulsation, the systolic pressure was estimated at 60 mm. Hg. At 9.33 a.m. a dose of eight milligrams of acetyl beta methylcholine was given subcutaneously and before all of it had been injected, flushing of face, salivation, restlessness and very marked bradycardia set in; the baby looked ominously sick; he began to sweat profusely and it was thought he was in "shock". Atropine sulphate had not been previously prepared and four minutes elapsed before 1/600 grain was injected subcutaneously (at 9.57 a.m.). During the next three minutes there was no apparent improvement in the baby's general condition and at 10 a.m. another larger dose, gr. 1/400, atropine sulphate was injected subcutaneously. The child remained in apparent shock; at 10.03 a.m. a dose of three minims of adrenalin was given and soon after this he rapidly regained his usual appearance so that at 10.07 a.m. he was free from any abnormal signs. During the course of these fifteen minutes an almost continuous electrocardiographic record was made (Fig. 2). At 10.30 a.m. the blood pressure was measured satisfactorily, systolic 90 and diastolic 60 mm. Hg.

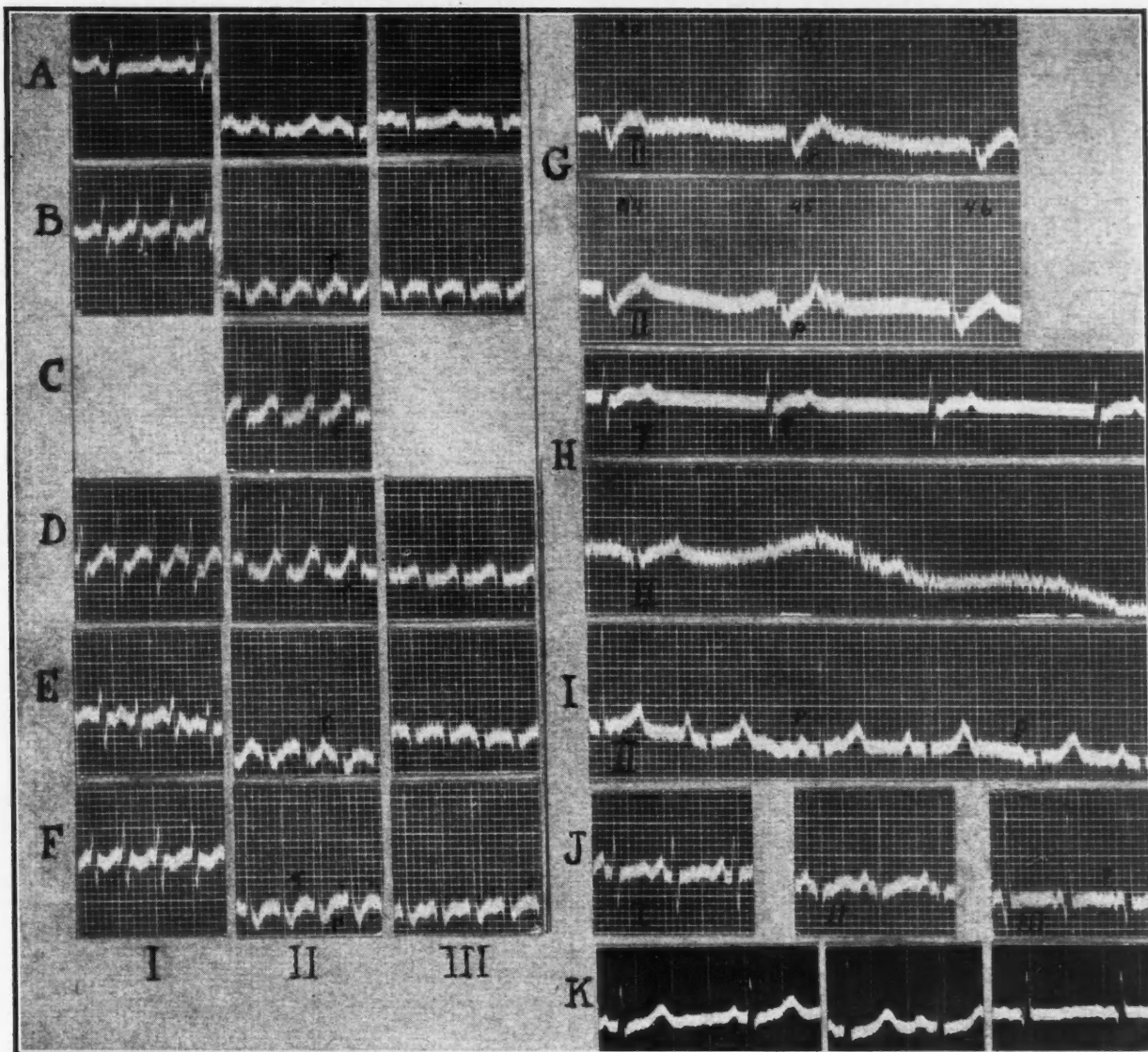
It seems worthy of special notice that on admission when the infant was bluish and cold the temperature was 94 degrees F.; then it rose during the first day and reached 99.8 degrees at 8 p.m. when tachycardia was observed; during the night while tachycardia persisted it rose gradually and was 101.8 degrees at 8 a.m. After restoration of normal rhythm some fever persisted for twenty-four hours, 100.6 to 99.8 degrees; during the following four days the temperature varied between 98.2 and 99.8 degrees. During these four days the weight increased from 9 lb. 13½ oz. to 10 lb. 2½ oz.

The child was observed in September, 1941, after an interval of over five years during which he had not had any recurrence of arrhythmia nor any other illness. Physical examination revealed no abnormalities.

COMMENTS

Cyanosis and coldness of the body drew the mother's attention to his abnormal state during the first and second episodes. The duration of the first attack cannot be estimated, but the second could not have lasted more than twenty-four hours. We observed the third attack from its onset; it lasted thirteen hours and forty minutes and was not associated with either cyanosis or coldness. On the contrary, except for a few minutes soon after the onset of tachycardia when the skin was "cool and clammy" (nurse's report), the child appeared normal and there was some fever, which could not be accounted for by any other condition but the tachycardia. The rise in the temperature began while external heat was applied with a baker but persisted during the four hours of experimentation with acetyl beta methylcholine when this heat therapy was discontinued and also for twenty-four hours after normal rhythm was re-established. It seems likely that as in some adults, so in some infants, paroxysmal tachycardia is associated with a small elevation of body temperature at least during the first twenty-four to thirty-six hours of the attack. Subsequently, as in this infant, the body temperature may fall to an abnormally low level (94 degrees F.). Thus it seems likely that the first attack must have lasted more than twenty-four hours and the second for about twenty-four hours. However, in making these interpretations of the observed facts, some reservations must be considered. The application of external heat for a few hours before the onset of the third attack and the administration of atropine sulphate (1/600 gr.) at the end of the second hour of this episode may have played some rôle in preventing a fall in temperature and perhaps also in causing the slight fever.

The clinical features presented by this case include only one (cyanosis) which occurs most frequently in infants who have paroxysmal auricular tachycardia and two relatively rare signs namely, low body temperature as well as fever. In an analysis of 21 cases,² cyanosis occurred in 15, coldness in 2 and in none of these cases was fever reported. Another element of the clinical picture which may be classed as a sign rather than as a symptom is that the mother or nurse commonly reports the rapid heart rate in describing the nature of the infant's condition. The rapid beating of the heart makes a visible impression on the chest wall



- A. May 5, 1936, 11.15 a.m. Normal rhythm about one-half hour after transition from second attack of paroxysmal tachycardia which had lasted for about twenty hours.
- B. May 5, 1936, 9.40 p.m. (one hour, 40 minutes after onset of third attack). Atrio-ventricular nodal paroxysmal tachycardia. Rate 300 to 333 per minute. Retrograde P wave (P). Repeated eyeball and carotid sinus pressure ineffective.
- C. (One hour 50 minutes). Lead II, immediately injection of 5 mg. A.B.M.C. (acetyl beta methylcholine); rate 285 to 300; note reduction in amplitude of R and marked depression of S-T interval; retrograde P wave (P) more clearly defined.
- D. (One hour 58 minutes). Eight minutes after injection of 5 mg. A.B.M.C.; diphasic T I and II. Subcutaneous injection 1/600 gr. atropine sulphate at 2 hours and 1 minute.
- E. (Two hours 10 minutes). Ten minutes after atropine sulphate injection, similar to electrocardiogram A; 10 mg. A.B.M.C. given at two hours, 30 minutes and 5 mg. at two hours 45

minutes; no clinical or electrocardiographic choline effects. Atropine inhibits action of A.B.M.C.

- F. May 6, 1936, 9.40 a.m. (13 hours 40 minutes). Rate 333 per minute. Retrograde P wave (P) more sharply defined.
- G. (Thirteen hours 53 minutes). Immediately after 8 mg. A.B.M.C. while infant restless, cyanosed and in shock; 20th, 22nd, 23rd and 44th, 45th, 46th beats. Retrograde P wave (P); slowest rate not recorded, probably 20 per minute for thirty seconds; in this record, rate 53 to 65.
- H. (Thirteen hours 56 minutes). Three minutes after (G) nodal rhythm persists; rate 48 to 73. Atropine sulphate gr. 1/600 given at thirteen hours and 57 minutes.
- I. (Thirteen hours 58 minutes). Five minutes after (G) sinauricular rhythm re-established. Lead II, P amplitude of P varies.
- J. (Fourteen hours 26 minutes). Leads I, II and III similar to A except for dyphasic P III.
- K. (September 29, 1939). Leads I, II and III, no recurrence of tachycardia during 55 months. Normal changes in axis due to growth.

which seems to vibrate. In the case of an adult with paroxysmal tachycardia the patient would mention palpitation as a prominent symptom.

The relative loudness of the first and second sounds over the five significant areas of the precordium were similar during the rate of 300, to what they were during sino-auricular rhythm rate 120 per minute. However, during tachycardia the sounds were of shorter duration and less loud than during normal rhythm. In this respect the physical signs are alike in infants and adults. Blood pressure could not be measured by the usual auscultatory method during ectopic tachycardia because no sounds could be detected over the brachial artery. The small volume of the pulse accounts for this phenomenon. The pulse pressure must have been a very small one, perhaps no more than 10 mm. Hg. Assuming that the normal circulation rate was maintained, then the output per beat was one-third of what it would be at a rate of 100 to 110 per minute. This reduction of the already small pulse volume of an infant to one-third of normal would make it too small to produce sound vibrations of sufficient amplitude to be audible. As the pulsations of the brachial artery could be felt, though faintly, it was possible to estimate systolic pressure as 60 mm. Hg. during tachycardia. About thirty minutes after restoration of normal rhythm, the blood pressure was 90 systolic and 60 diastolic.

The action of acetyl beta methylcholine.— Both the first and the last doses produced the well known constitutional vagotonic effects of flushing of face and neck, salivation, and profuse perspiration. Although vomiting was expected, it did not occur. The three doses of this substance that were administered within one hour after atropine sulphate had been given produced no apparent effects. On the other hand the latent period between the subcutaneous injection of atropine sulphate and the cessation of salivation, flushing, sweating and bradycardia proved to be rather long, about six minutes. Indeed it was only after three minutes of adrenalin had been injected subcutaneously that the baby began to recover from the state of shock which followed the last dose of acetyl beta methylcholine. This leads one to think that adrenalin, which acts as promptly as acetyl beta methylcholine, should be given first, as an antidote, and it should be ready for subcutaneous administration before the choline compound is injected.

The first dose contained five milligrams and it produced changes in the ventricular complexes of the electrocardiogram but did not affect the ectopic rhythm. The last dose contained eight milligrams and it caused marked bradycardia (by slowing the rate of the ectopic rhythm), which was followed in five minutes by resumption of normal sino-auricular rhythm; but it caused no significant changes in Q.R.S. or T. waves. The state of shock which followed the last dose must have been due to the sudden change in heart rate from 300 to marked bradycardia, 20 to 53 per minute. The general constitutional effects of the first and the last doses were similar except for this one element of shock which was absent after the first dose because tachycardia persisted.

How should the differences between the effects of these two doses on auricular rhythm and intraventricular conduction be explained? Our observations offer no satisfactory clue. That the last dose was 60 per cent larger than the first may be a significant factor. However, this view cannot be accepted without serious doubts, for the whole amount of the second dose had not been injected when bradycardia began and four minutes later there were no abnormalities of Q.R.S. T complexes, whereas the reduction in voltage of R waves and depression of T waves appeared within one minute after the injection of the first dose. One is inclined to think that the explanation is to be found by studying the relation between the state of auricular rhythm centres and of ventricular myocardium at different periods of time after the onset of paroxysmal tachycardia, and the action of the infinitesimal amount of acetyl beta methylcholine which is necessary to produce the effects of this substance, an amount which must be only a very small fraction of five milligrams.

Cohn and MacLeod³ have shown that, applying one milligram of acetyl beta methylcholine to a bullfrog's heart shortens the duration of electrical systole and the refractory period. In our records of ectopic tachycardia the end of T wave is not sufficiently well defined to afford satisfactory measurements of the duration of ventricular systole before and after the first dose. The duration of systole during bradycardia following the last dose cannot be compared with that of the ectopic rhythm beats because of the very marked differences in heart rates. Had we not given any atropine or adrenalin after the last dose it would have been

of interest to compare the duration of ventricular systole of normal rhythm while the choline compound remained active with that of normal rhythm, independent of any drug effects. Neilsen and Trier⁴ have made observations which strongly suggest that digitalis acts on myocardium by sensitizing it to the effects of acetyl choline. This leads one to think that the oral administration or the intramuscular injection of two grains of digitalis perhaps in two doses of one grain each at an interval of two hours might be a good program of preparation for the injection of five to eight milligrams of acetyl beta choline in treating an attack of paroxysmal auricular tachycardia in an infant. It is not unlikely that in some instances, the digitalis alone might cause the rhythm to change to normal.

CONCLUSIONS

Atrio-ventricular paroxysmal tachycardia in an infant aged one month was treated with

acetyl beta methylecholine. The first dose, 5 mg., administered during the second hour of the attack failed to restore normal rhythm but caused changes in amplitude of Q.R.S. and depression of S-T. interval. The last dose, 8 mg., produced bradycardia (rate 20 to 56) by slowing abnormal rhythm for about five minutes, then normal rhythm was restored, but there were no changes in Q.R.S. and T waves. Adrenalin seems to be preferable to atropine in controlling the disagreeable systemic effects of acetyl beta methylecholine.

REFERENCES

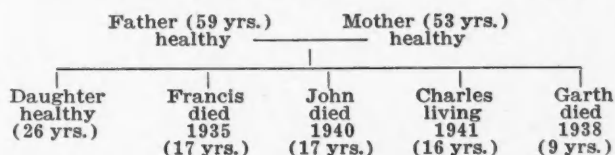
1. STARR, I. JR.: Acetyl beta methylcholine III. Its action on paroxysmal tachycardia and peripheral disease with a discussion of its action in other conditions, *Am. J. M. Sc.*, 1933, 186: 330.
2. GOLDBLOOM, A. AND SEGALL, H. N.: Auricular paroxysmal tachycardia in infancy (first year), *Canad. M. Ass. J.*, 1941, 45: 64.
3. COHN, A. C. AND MACLEOD, A. G.: The effect of acetyl beta methylcholine on the frog's heart, *Am. Heart J.*, 1939, 17: 305.
4. NIELSON, N. A. AND TRIER, M.: Comparison of the changes in the human electrocardiogram following the administration of strophanthin and acetyl choline and vagal stimulation, *Am. Heart J.*, 1939, 17: 515.

PARATHYROID INSUFFICIENCY IN WILSON'S DISEASE*

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THE present report deals with four cases of hepato-lenticular degeneration, occurring in a family of five children. In two of these there was evidence of parathyroid insufficiency. The first of these cases was reported by Dr. D. M. Baltzan in 1935. The family distribution is shown by this diagram—



In reviewing the history of the oldest boy, Francis, which was reported by Baltzan, the typical symptoms of a hepato-lenticular degeneration were apparent, but besides the extra-pyramidal signs there was a manifest tetany. The blood calcium varied from normal or slightly higher to as low as 5 mg. per cent while the blood phosphorus lay between 2.5 and 6.5 mg. per cent.

The histories of the three younger brothers are not as complete as we would like to have

them, but the main reasons for this publication are the histopathological findings obtained in the case of the second boy, John.

This patient was admitted to the Saskatoon City Hospital in July, 1940, being then seventeen years of age. He had been sick for more than four years but became rapidly worse during the three weeks preceding admission.

The first symptom was a tremor of the hands, a coarse rhythmical movement of Parkinsonian type. It was present continuously during the five years preceding admission to hospital and gradually increased in severity. It was most marked when voluntary acts were attempted. During the last two years there had been a tremor of the left leg also. Though very slight it was present during sleep. By the end of the second year walking had become difficult and a stagger developed. For the last three months of life he was unable to walk without assistance and for the last month he remained in bed.

Mentally the boy was very bright and previous to his illness had done well at school. Writing became difficult and eventually impossible, but until the third year of the illness it was still sufficiently legible to enable him to pass his examinations. During the second year his speech was affected, becoming laboured, slurred and slow and gradually deteriorating into complete anarthria. In view of the special pathological findings, later recorded (endarteritis obliterans), it is of interest that the patient never smoked.

On examination at the time of admission the patient showed a tremor affecting both upper extremities and the left lower extremity. The muscles of both arms showed hypertonicity, increased on sudden passive movement, the left arm being more affected than the right. The small muscles of the hands did not appear to be

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involved. The reflexes and sensory functions of the upper extremities were normal. In the lower extremities there was slight hypertonicity, the knee and ankle reflexes were active and equal and ankle clonus was present being most marked on the right side. There was a bilateral Babinski which was rather difficult to obtain. Sensory functions were unimpaired. Percussion of the abdomen showed decreased liver dullness. The urine, ten days before death, had a specific gravity of 1.030, a reaction of pH 6.5 and showed the presence of albumen (++) and sugar 0.3 per cent. Death occurred in August, 1940.

In the post-mortem examination interest centred on the liver and brain. The lungs, heart, alimentary canal, adrenals, kidneys, bladder and prostate were normal. The spleen was enlarged and congested but otherwise normal. The liver was normal in size and of normal colour but the surface was nodular. On section the cut surface showed a lobular arrangement with areas, $\frac{1}{2}$ to 1 cm. in diameter separated by strands of fibrous tissue. From the outside the brain was normal in appearance. A horizontal section made through the basal ganglia showed the striatum and pallidum normal in appearance but the thalamus was pale in colour and of soft consistency. The brain and sections of the liver were fixed in formalin, one parathyroid and the pituitary in Heidenhain's Susa fixative.

The histological examination of the brain showed no changes in the cortex. No major alterations were seen in the basal ganglia, that is, neither the nerve cells, the neuroglia nor the mesodermal tissue of the vessels appeared to be damaged. But in the tissue of the basal ganglia adjacent to the internal capsule and in the parts of the internal capsule near the lenticular nucleus, the caudate nucleus and the thalamus, the parenchyma showed a spongy appearance, status spongiosus.

The histopathological changes in the liver were striking: the interlobular tissue was definitely increased, with accumulations of lymphocytes and many undamaged bile ducts. Many liver cells and cell fragments, apparently remnants of liver cells were found dispersed in this replacement tissue. An outstanding feature was a change seen in the nuclei of many liver cells, particularly in the cells forming the periphery of the lobules. These nuclei were swollen in varying degree and with the swelling there was a diminution in the chromatin content, so that the greater the swelling the less nucleochromatin the nucleus contained (Figs. 1 and 2). Finally, in the end state the nucleus had burst and the remaining empty nuclear membrane had become convoluted. In some of these liver cells no trace of nucleus or nuclear membrane remained, giving the appearance of "perforated" cells. In the cells nearer the centre of the lobule these changes were slight or completely absent and in contrast with those of the periphery, the liver cells showed here a high content of nucleochromatin. Similar or identical changes in the liver were found in the eldest boy, Francis, and were included in Baltzan's report of the case.

The parathyroid gland showed important changes for which we could not find any analogue in the literature. From a morphological point of view the description is easy: parts of the glandular parenchyma are replaced by adipose tissue (Fig. 3). This change is irregular and is more pronounced on one of the two poles of the organ. Associated with this atrophy there is a marked endarteritis obliterans of the parathyroid vessels (Fig. 4). It might be noted that the arteries of the parathyroid are endarteries (Morgan) and that in all probability the diminution of the parenchyma is a simple consequence of gradual interference with the circulation. The small vessels and sinusoids are enlarged and gorged with

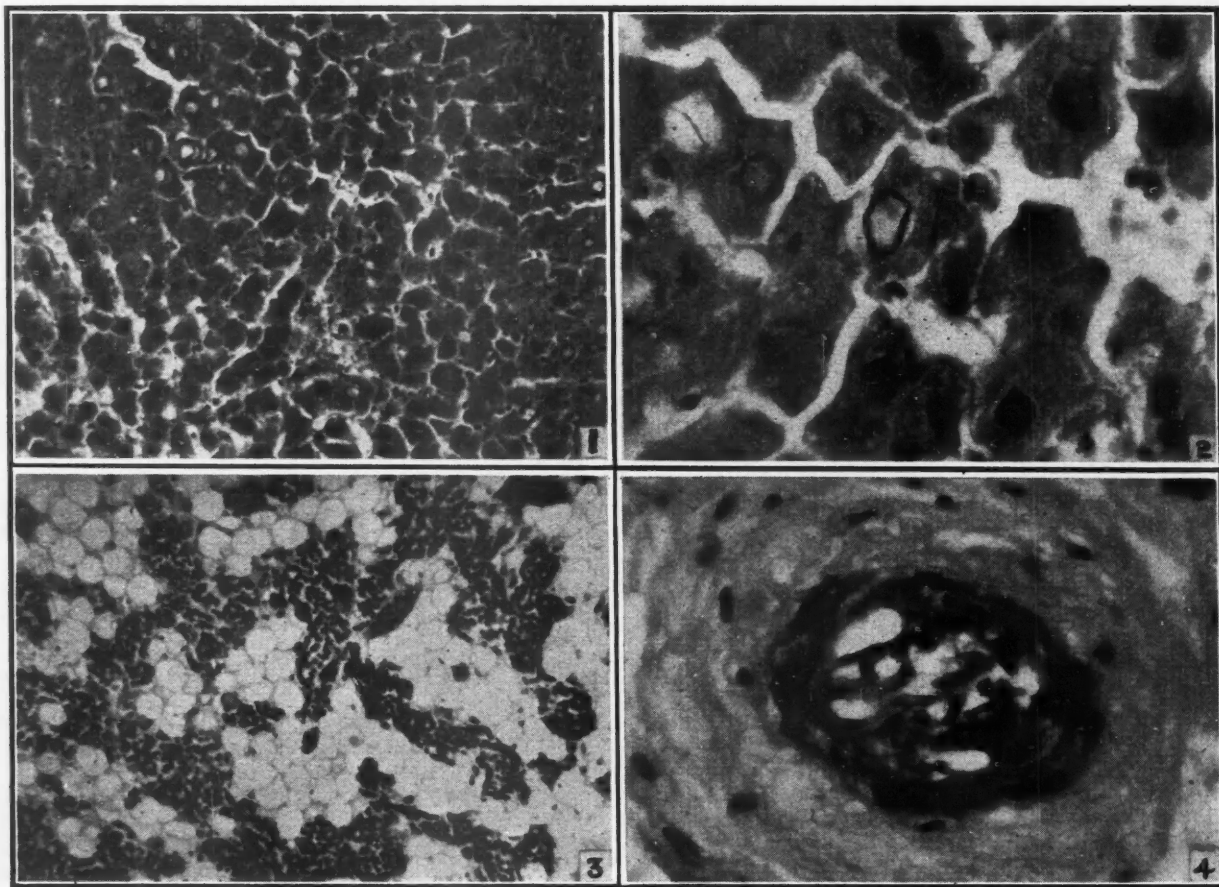


Fig. 1.—Liver. Formalin, paraffin, hæm.-eosin. 75x. Fig. 2.—From same section as Fig. 1. 430x. Fig. 3.—Parathyroid. Susa fixation, paraffin, iron-hæm.-eosin. 100x. Fig. 4.—Vessel of parathyroid. Susa fixation, paraffin, iron-hæm.-eosin. 400x.

erythrocytes. The oxyphils of the parenchyma seem to be increased, mostly aggregated in clumps and containing an unusually large number of double nucleated elements. This latter characteristic, that is, the frequency of double nucleated oxyphils, is shared by another organ of this patient, namely the pituitary. Since we are dealing here with a single case showing some very uncommon features, we dare not claim any relationship between the increased number of oxyphils in the parathyroid and a similar increase in the pituitary—nor can we relate them to the other pathological changes. We would simply report our findings.

The interest of this case is increased by the presence of the disease in all his brothers and we therefore add to this report the histories of the two brothers Charles and Garth.

Charles, the only one of the boys still alive, is 16 years old. He was examined in April, 1941, and in August, 1941. Mentally he appears normal for his age and education. Two years ago difficulties in speaking and swallowing appeared, soon followed by difficulties in the movements of the upper limbs. He smokes excessively, but did not start until after onset of the morbid symptoms. He complains of short, infrequent spasms in the extremities.

He has a masked face with seborrhœa and acne juvenilis. The winking of the lids is very rare. His speech is nasal and indistinct. His gums are very cyanotic, especially the superior. The tongue moves very slowly, but shows no anatomical changes. The uvula is deviated to the left. His hands and feet are thin, the muscles being contracted as in typical post-encephalic attitude with semiflexion of the metacarpo-phalangeal joints. There is marked acrohypothermia. All movements of the extremities are slow but are well performed. There is hypertonicity in both arms and hands with the symptom of the toothed wheel ("roue dentée"). Occasionally the fingers assume "pill turning" attitudes. The lower extremities are less hypertonic than the upper. In walking the automatic pendular movements of the arms are still preserved on the right side, but considerably decreased on the left side. In April, 1941, a slight Babinski was found on the left side and the fan phenomenon of the toes was present on both sides but most marked on the right. In August, 1941, no Babinski symptom could be elicited. Ankle clonus (++) is more marked on the right side than on the left. The patellar reflexes are normal and there is no patellar clonus.

The pupils are widely dilated and contract slowly, giving the reaction of tonic pupils. There is no Fleischer ring, no Chvostek phenomenon, no Trousseau. The nasociliary reflex is increased, as in post-encephalitic Parkinsonism.

The liver does not appear to be increased in size. His blood calcium (11.4 mg. per cent) and blood phosphorus (3.3 mg. per cent) are normal. Hæmoglobin 86 per cent. Red blood cells, 6,690,000. White blood cells, 4,650. Colour index, 0.65.

In view of the striking extrapyramidal symptoms and of the familial history, the diagnosis of Wilson's hepato-lenticular disease was easily made.

The youngest brother, Garth, developed symptoms of abdominal pain and listlessness in July, 1938. He was then ten years of age. A month later, when he was examined, in addition to the above symptoms, he had anorexia and a marked enlargement of the abdomen, which was dull to percussion. All tests were negative and there were no symptoms pointing to the nervous system. He showed intense anxiety about his abdomen, which required repeated paracentesis for the removal of 2,000 to 4,000 c.c. of fluid with a specific gravity of 1.010. His condition became progressively worse due to the

anorexia and an uncontrolled diarrhœa. Death occurred in October, 1938.

The post mortem findings were as follows: The body was that of an extremely emaciated boy. There was an operation wound and recent stab wound in the abdominal wall, which was distended. The head was large, but did not show hydrocephalic features. In the thorax there was nothing abnormal. The peritoneal cavity contained a large amount of clear straw coloured fluid. No adhesions were present. The wall of the small and large intestine was thickened and oedematous throughout. The liver was small, firm in consistency and weighed 515 grams. Its surface was nodular. The gall bladder was enlarged, the bile containing a considerable amount of biliary sand. The right and the left hepatic ducts were dilated. On section the liver substance was firm and resistant and showed a coarse cirrhosis.

Histological examination: the liver parenchyma is divided by strands of fibrous tissue into islands of hyperplastic liver cells. The fibrous strands are very cellular and contain many biliary ducts. Diagnosis: recent progressive portal cirrhosis. There are no changes in the nuclei of the liver cells as were described in his two brothers Francis and John.

The pancreas was firm in consistency. The islets were unusually distinct, but otherwise there were no abnormal findings. The spleen (112 grams), adrenals and kidneys were normal.

The brain was very large for a child of this age and weighed 1,595 grams. Nothing abnormal was noted on the surface. On section there was discoloration and mottling in the region of the basal ganglia, particularly around the lenticular nucleus. There were a few scattered minute cavities. Microscopically: there was a complete absence of necrosis and of the typical reactive appearance of the neuroglia. The only pathological feature was a hyperplasia of the fascicular oligodendroglia of the white strands in the basal ganglia, but it was difficult to decide whether that was due to an active proliferation or only a relative increase, due to the decrease (shrinkage) of other tissue components.

DISCUSSION

Though we had to deal only with a single family in which four sons were affected by hepato-lenticular disease, we believe that some special features make it worth recording. Firstly, we have here a family of one girl and four boys, in which only the males were affected by the disease. The two oldest brothers were subject to a complication due to a deficit in the parathyroid activity, revealed clinically by Baltzan in the first case and found in the second case by microscopical investigation. This latter fact merits emphasis because we found not only an atrophy of the parenchyma of the parathyroid, but also an endarteritis obliterans which was probably the etiological factor. We do not know the alterations of the glands in the first brother and we have no evidence of a clinically manifest tetany in the second. Therefore we cannot discuss here the question of familiarity and endogenous origin of the tetanic syndrome, though of course such an explanation is very tempting. The marked alteration of the nuclei of the liver cells in the first two brothers and the absence of similar changes in the youngest brother should be especially emphasized.

The order in which the patients were affected is noteworthy: The oldest first, the second after him and then the fourth, in whom the progress of the disease was so rapid that his death preceded that of the second brother. Finally the disease appeared in the third brother, who shows typical signs of a lenticular disease but so far not the slightest symptom indicating a diminished function of the parathyroids. While in the three older brothers the nervous symptoms were predominant, in the youngest the symptoms were simply those of a hepatic cirrhosis, although at the post-mortem alterations of the lenticular nuclei and their surroundings were found. This case differs from the others and from the typical clinical picture in that clinical symptoms due to liver damage are unknown in Wilson's disease. Nevertheless the family history and autopsy findings justify such a diagnosis in this case.

In the three older brothers there were clinical symptoms indicating an affection of the pyramidal tract and in the second case the microscopical investigation revealed a status spongiosus, affecting the internal capsule, thus furnishing an adequate explanation of the pyramidal symptoms.

The anatomical changes in the central nervous system differed greatly in our cases and were not in complete accordance with the clinical findings.

Finally we wish to point out that the symptoms in the third brother developed in a fairly regular course, first head, then upper and finally lower limbs, which might point to a body localization in the lenticular nucleus and its regular, gradual involvement.

As to the pathogenesis of the disease we do not feel that it would serve any useful purpose to discuss here the question, so often raised, whether the liver affection causes the nervous alterations or vice versa, or whether both are caused by a common factor. Yet in view of the involvement of the parathyroids in at least two of the brothers, one should try to fit such alterations into the nosological picture. While it may be recalled that an endarteritis obliterans of brain vessels has been already reported in hepato-lenticular disease (Freeman), we are not justified in concluding that the endarteritis of the parathyroid gland in our case is of similar origin.

SUMMARY

This paper reports the occurrence of four cases of hepato-lenticular degeneration (Wilson's disease) involving all four brothers in a family of four boys and one girl. The histological changes of the liver and brain are described. In two of the cases there is also evidence of parathyroid insufficiency and in one of these there is a marked endarteritis obliterans, providing a possible explanation of the diminished function of the gland. No attempt is made to correlate the parathyroid changes with the lesions of the liver and brain but this association in the two cases is simply recorded.

We wish to thank Dean W. S. Lindsay, Professor of Pathology in this University, for his tireless help and interest.

REFERENCES

1. BALTZAN, D. M.: A hepato-cerebral syndrome, *Canad. M. Ass. J.*, 1936, 34: 544.
2. FREEMAN, W.: *Neuropathology*, Saunders, Phila., 1933, p. 292.
3. MORGAN, J. R. E.: The parathyroid glands, *Arch. Path.*, 1936, 21: 10.

Apply thyself to the study of the secrets of nature: do not stray in the valley of philosophy. What is more precious than knowledge? Have any ever repented of devoting themselves to it? Subjects and kings all have need of the assistance of learned men. The nobility of knowledge has no more limits than the attributes of the Creator. As long as these cannot be limited, how can we fix boundaries to the

others? Do not pause at the shell of things: seek to penetrate to the marrow. From the surface pass to the interior: does the bird fly in the air without wings? The outside of a house is as a place of passage: it is within one seeks repose. Pearls are not found on the borders of the sea: if thou dost wish to possess them thou must plunge in the depths.—Counsels of Nobi Yousouf Effendi to his son (1694).

ANÆSTHESIA IN WAR CIRCUMSTANCES*

BY WESLEY BOURNE

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Iuppiter illa piæ secrevit litora genti,
 Ut inquinavit ære tempus aureum;
 Ere, dehinc ferro duravit sæcula, quorum
 Piis secunda vate me datur fuga.†

Horace, Epode XVI, 63.

LIKE events to those which occasioned the Peloponnesian War, though varying in force and form with every new combination of circumstances, are bound to occur as long as the nature of man continues the same. Such was the fateful prophesy of the first historian, Thucydides, many, many years before the antithetical vaticination of Horace nineteen hundred and seventy years ago. Still Utopian, as in William Morris' *News from Nowhere*, the Golden Age has not been realized; yet we must unswervingly continue more collectively to achieve the perfect state, where shall reign Isaiah's Prince of Peace, despite the seemingly ineludible doom foreshadowed by the Thracian chronicler. Erasmus, in his *Querela Pacis*, has Peace complaining that mortals, in driving her away from them, remove the source of all human blessings, and let in a deluge of calamities on themselves, the unutterable miseries of war. It may be that when this most wicked of Iron Ages has spent itself, peace will be made permanent. In the meantime, however, we must meet the vicissitudes of the hour. Notable among these are the problems of pain, comprehensively to be considered under anæsthesia.

While it is evident that the general principles of anæsthesia are not affected by the circumstances of war, it is equally evident that it is our duty assiduously to seek those means in anæsthesia which are especially suited to the exigencies of battle; and I hope to show that although men of the fighting services are of necessity exceptionally fit before an engagement, they may frequently be most urgently in need of the best attention known to anæsthesia after the conflict. While our subject cannot be exhausted in a few minutes, it may be treated briefly, and

sufficiently for the occasion, as we consider the circumstances variously obtaining before, during, and after anæsthesia; always mindful of the axiom that whatever is done should suit the general condition as well as the surgical requirements of a given individual.

Slight injuries.—Wherein there is little or no shock, the subject of lesser lesions will have received, promptly for his pain, an opiate, with which it is well to give scopolamine to enhance its action, dispel fear and cause amnesia. If much more than an hour elapses before the start of anæsthesia, these drugs may be administered again. And now, the choice of the anæsthetic is from among those of "local" and "general" procedures. Usually, in this class of case, in which muscular relaxation is not particularly required, it will suffice to use local infiltrations or "nerve-block" injections of drugs like procaine; inhalations of nitrous oxide, cyclopropane, vinyl ether or ethyl ether; or, intravenous administrations of one of the shorter-acting barbiturates, such as pentothal. The selection will be influenced by the number of cases to be done, the number of anæsthetists, and the extent of the surgical facilities. The time factor may be important.

Severe injuries.—Casualties manifesting shock are to be handled with the greatest circumspection and with the least possible surgical intervention until the state of the blood circulation is restored. Any such case must be actively treated for shock until he has recovered fairly well from the early physical condition of depression, before an operation is attempted. During the interval, to conserve energy one may give small doses of opiates, such as morphine and scopolamine with vigilance in regard to respiratory depression; one gives supporting intravenous fluids, until the pulse rate decreases and the blood pressure goes up considerably; and one applies heat for the restoration of body temperature. So soon as these circumstances have been rendered relatively stable as evidenced from frequent observations on the character of the breathing, the rate of the pulse and the degree of the blood pressure; so soon as these three seem to be on a satisfactory scale in rela-

* Read by invitation, at the Annual Meeting of the Massachusetts Medical Society, May 22, 1941.

† "Jupiter set apart these shores for a righteous folk, ever since with bronze he dimmed the lustre of the Golden Age. With bronze and then with iron did he harden the ages, from which a happy escape is offered to the righteous, if my prophesy be heeded."

tion to one another, the patient may be considered ready for operation.

The question of anaesthesia now presents itself, and at once it may be said that, with an adequate personnel in a well equipped unit, it is not difficult to decide on what anaesthetic drugs to use and what procedures to employ. Thinking of choice like this, I am minded of the remarks of Albert Guérard, Professor of Literature of Stanford University, that "a school is 'consolidated advertising', a pressure group. . . . But the schools also foster elements which are inimical to art as well as to good manners: dogmatism (every school has discovered 'the only possible method'); superciliousness ('We have done with the old fogeys'); cliqueishness ('No one shall have wit, but ourselves and our friends'). A school imposes—a false consistency." So in anaesthesia, let us select impartially, although carefully, from among the drugs at our disposal as well as from the methods of their administration, with a view to their appropriateness to the conditions of the man about to undergo an operation. Emerson has said that "a foolish consistency is the hobgoblin of little minds". In pre-operative medication, it is customary to use one or more of the sedatives; morphine, dilaudid, a barbiturate such as nembutal or pentothal, avertin, and scopolamine or atropine. Usually, it matters little how these are combined, only one tries to give just enough to produce the desired effects, that is, completely to obnubilate the mental faculties, and so lessen the shock which comes of fear; effectively to inhibit secretions, and so avoid respiratory obstruction; considerably to reduce the amount of general anaesthetic which may be used; and, commendably, to cause the induction of anaesthesia to be much easier.

Looking at the matter in another way, one tries to give just enough of these drugs to produce the desired effects without too much interference with the respiratory movements, too much depression of the circulation, without disturbances to the oxidation-reduction systems. Lest we forget, those braves who come to us, as Homer said, "from out the slaughter, blood, and battle-din", from fighting for us in the "fire, and water, and earth, and lofty ether unbounded", in the words of the pre-Socratic philosopher, Empedocles; these brave ones are none the less subject to emotional impression, none the less susceptible, perhaps inconsciently,

to fear, to anxiety, to apprehension. Sedatives soon succeed in quelling such storms of feeling.

For cases of severe injuries, the selection of anaesthetics and of the methods of their administration is done from those belonging to the greater groupings of anaesthesia, namely: regional anaesthesia, that is, local or spinal; and general anaesthesia, whether inhalation or intravenous. I shall consider the anaesthetic materials jointly, with means of their administration, and try to show their suitabilities to the surgical procedures on patients suffering from this type of lesion.

Regional.—Procaine, metycaine, nupercaine, and pontocaine are the drugs just now in favour for producing regional anaesthesia. Virtually, they cause little, if any, impediment in the vital processes. Their employment should, therefore, be encouraged. And although, in execution, local infiltration, field block, the different forms of nerve block, and spinal anaesthesia are found by a large number of surgeons to be tedious and time-consuming; yet as these have become in many instances part of the duties of the anaesthetist—the instances are increasing—in consequence, not only is the surgeon freed of the bother but, through increased individual experience, the dangers have become almost negligible.

So long as preliminary sedation has been made complete, the local and block types of anaesthesia may be considered almost ideal for operations on the head, neck and extremities; and even in the abdomen as well as the thorax, on those rare occasions when spinal anaesthesia may not be carried out on account of the inadvisability of moving the patient. The advantages of spinal anaesthesia are very great, especially on account of the muscular relaxation and the excellent recovery. Digby Leigh and I⁵ have shown that, with the exception of blood dilution, the many changes which are apt to take place from general anaesthesia do not appear in spinal anaesthesia. Let it be remembered that some of these changes in metabolism may seriously impede the course of recovery in the patient who suffers some extensive debilitating lesion.¹

At present I favour the use of percaïne for spinal anaesthesia as it lasts longer than any other of its kind, and the Etherington-Wilson technique for its administration^{2,3} as with the sitting posture much less of the drug is required. Someone will object to the sitting-up of a morphinized patient, but it has been found that blood pressure and pulse rate change very little.

It would seem that spinal anæsthesia is only contraindicated wherein the fall in blood pressure, which it frequently causes, is to be feared, as in cases of marked hypertension and advanced cardiovascular disease. Such are not likely to be met among war casualties from the personnel of the fighting forces, but they are being met among those from civil life in the present conflict. As intimated before, there will be much less fall in blood pressure if relatively large quantities of depressant drugs have been given prior to the production of all forms of regional anæsthesia so thoroughly to subdue the cerebral cortex as utterly to bemuddle its organs of thought.

General.—Being a little uneasy lest the devotees of inhalation anæsthesia say that I have over indulged spinal and the like, let me hasten, not to recant, but to say enough so that they may not think me guilty of apostasy. It should be evident that the intravenous method is not advisable for other circumstances than those of minor surgery; for war conditions, the giving of such a drug as pentothal intravenously for an operation of more than twenty minutes, or to administer it fractionally, might well be objected to on the ground of too much detail.

With regard to inhalation anæsthesia, although ether still has a definite place in surgery, although it may be used with relative ease and safety by those who are not too well experienced, and although, when better equipment is not at hand, it is quite permissible to give ether by the "open drop" method; yet nowadays all surgical centres will have an adequate number of anæsthetic machines from which nitrous oxide, cyclopropane or ether may be administered alone or with one another. The high accomplishments of inhalation anæsthesia of late years are the employment of cyclopropane,⁹ the absorption of carbon dioxide,⁷ and the closed intratracheal technique.⁸ The advantages of cyclopropane are already too well known for me to be prolix in the matter, but it may be said that there are two splendid combinations: one of avertin by rectum with cyclopropane, following, by inhalation, the other of pentothal by vein,⁴ with cyclopropane by inhalation immediately after. In each instance a smaller-than-usual dose of the first drug is given, the production of full anæsthesia by cyclopropane is done much more easily than ordinarily, and there would seem to be perhaps some salutary synergistic action. In busy periods, however, the giving of avertin takes too much time.

The removal of carbon dioxide from the expired air permits in the same case the continued and repeated use of the anæsthetic materials. The closed intratracheal method precludes respiratory obstruction; obviates interference with some surgical procedures, such as in operations about the head, neck and chest; gives absolute assurance of a plentiful supply of oxygen directly to the lungs; affords quieter breathing and a softer abdomen, although narcosis is not profound; and supplies the ready application of Guedel's method of artificial respiration.

So much then for a cursory account of the circumstances prevailing before anæsthesia essential to the treatment of injuries during war. It may serve to indicate the extent of our selection. Neglecting for the nonce the lesser ailments, let us follow a little the course of anæsthesia during operation for a major lesion. Having, in a given individual, chosen the drugs and the methods of their administration, and having produced the required degree of narcosis, it becomes the duty of the anæsthetist carefully to manage its progress. Here let me say that there is no reason why the quality of anæsthesia as well as the ability of the anæsthetists should not be just as high and as great for surgical units of war time as they may be under any other circumstances. The best is none too good for those who fight for us. Before the operation is started the intravenous administration of fluids ought to be begun and continued throughout at a rate suitable to the state of the blood pressure and character of the pulse. Of the clear solutions, glucose should be used in the regional cases, and saline only should be given to the cases of general anæsthesia for the simple reason that in these there is invariably a hyperglycæmia at the time. Either may be replaced by blood or plasma very readily.

To this fluid stream may be added without delay either analeptic and resuscitating or sedative drugs momentarily. Restlessness, which occasionally occurs during regional anæsthesia, can be controlled promptly by the injection of a morphine solution into the intravenous tube. Analeptics, too, may be given in this way. Concerning these, I am firmly of the opinion that they should not be used routinely nor in anticipation of shock. They tend to stimulate the central nervous system and to reverse the effects of sedatives, for example, in spinal anæsthesia, when morphine and scopolamine have been given especially to produce their desired actions, I have

found that these beneficial effects will be definitely minimized by the administration of a mixture of ephedrine and posterior pituitary extract. Why wantonly undo that which was deliberately done with good reason? It has been shown that analeptics are not needed in spinal anaesthesia by the Etherington-Wilson technique, even in upper chest surgery, in about 60 per cent of cases.² A most remarkable synergistic effect takes place when posterior pituitary (pitressin) is given along with ephedrine.⁶ The one supplements and enormously enhances the power of the other, the result being more effective than larger individual quantities of these drugs in restoring blood pressure and respiration and in abolishing general collapse.

Usually, when it is deemed advisable to use these materials, their hypodermic administration will suffice. The intravenous avenue is not recommended unless the patient is very far gone. This form of stimulation is seldom needed in general anaesthesia, indeed, with cyclopropane it is contraindicated. When modern machines are used a liberal supply of oxygen is assured during inhalation anaesthesia, but in the spinal procedure one is well advised regularly and actively to administer oxygen on account of the depressed breathing, the sluggish circulation, and the dilution of the blood; in other words, on account of the impoverished respiratory exchange and the reduced oxygen carrying power of the blood.

The immediate after-care of a patient just operated upon is not only extremely important but supremely so to the anaesthetist. It becomes him to have a hand in the matter, for by how much the more the possibilities are considered, by so much the more will sequelae be checked at their source or, at least, be caught in incipience. After operation for a severe injury the patient should be moved with the greatest gentleness, particularly in regard to the horizontal plane, and any desired change in position ought to be made very gradually. This significance concerns the circulation chiefly. Intravenous supporting fluids are to be given as frequently as indicated and to these may be added analeptic drugs, or pain relieving drugs as required. Oxygen therapy should be kept up as long as respiration and circulation are depressed, this implies that the upper respiratory passages must be perfectly patent and that the gas be made moist. To lessen the likelihood of post-operative pulmonary complications, there should be some change made in the patient's position

every hour, he should be encouraged to breathe forcefully every hour, and carbon dioxide may be added to the oxygen occasionally. In order that invaluable information be not lost, and for the sake of uniformity, each surgical unit should be obliged from headquarters to keep records of each case, along standard lines, of all that specially pertains to anaesthesia.

Although I have given a rather discursive account of the course which anaesthesia may take under conditions of war, yet it is in good earnest, and such is my appeal to those who are called to be anaesthetists in an ancillary corps of the fighting forces that, in closing I would offer an instance, or two for emulation and of warning: George Saintsbury has said that Boswell "had so steeped himself in his hero that he at last thought and saw all things in Johnson; . . . this omnipresence of the subject in its quiddity". Irving Babbitt in *The New Laokoon* declares that,—"Any one who thinks he has got the Truth finally tucked away in a set of formulæ, is merely suffering, whether he call himself theologian, or scientist, or philosopher, from what may be termed the error of intellectualism or the metaphysical illusion. . . . He should therefore have formulæ and categories, but hold them fluidly; in other words, he must have standards, but they must be flexible; he must have faith in law, but it must be a vital faith."

REFERENCES

1. BOURNE, W.: Anaesthesia for the Republic of Plato, *Yale J. Biol. & Med.*, 1938, 11: 149.
2. *Idem*: Surgical procedures on the handicapped patient: Factors determining selection and administration of anaesthetics, *Surg., Gyn. & Obst.*, 1939, 68: 519.
3. BOURNE, W. AND O'SHAUGHNESSY, P. E.: The Etherington-Wilson technique in intrathecal segmental analgesia, *Canad. M. Ass. J.*, 1936, 35: 536.
4. LUNDY, J. S.: Intravenous and regional anaesthesia, *Ann. Surg.*, 1939, 110: 878.
5. McGill University, Department Pharmacology: Unpublished.
6. MELVILLE, K. I.: Combined ephedrine-pituitary extract (posterior lobe) therapy in histamine shock, *J. Pharmacol. & Exper. Therap.*, 1932, 44: 279.
7. WATERS, R. M.: Carbon dioxide absorption from anaesthetic atmospheres, *Proc. Roy. Soc. Med.*, 1936, 30: 11.
8. WATERS, R. M., ROVENSTINE, E. A. AND GUEDEL, A. E.: Endotracheal anaesthesia, *Anes. & Analg.*, 1933, 12: 196.
9. WATERS, R. M. AND SCHMIDT, E. R.: Cyclopropane anaesthesia, *J. Am. M. Ass.*, 1934, 103: 975.

RÉSUMÉ

Le mode d'anesthésie doit être adapté au sujet qui doit être endormi ou analgésié. Dans les blessures légères, le choix de l'agent anesthésique ou analgésique est assez vaste. Dans les blessures graves, on doit attendre que la période de choc soit passée et assurer la reprise d'une température, d'une tension artérielle et d'un pouls normaux. La médication pré-opératoire consistera dans les sédatifs usuels: opiacés, barbituriques, etc. L'anesthésie proprement dite sera régionale ou générale selon les cas. L'anesthésie régionale sera faite à la procaine, à la métycaine, à la nupercaine ou à la pontocaine, au choix. L'anesthésie du type

local, ou de blocage, est idéale pour les opérations sur la tête, le cou et les extrémités, et dans certains cas, sur le thorax et l'abdomen. On ne saurait trop louer la rachianesthésie à la percaine: celle-ci n'est contre-indiquée que dans les cas où l'on redoute une chute importante de la T.A. Quant à l'anesthésie générale, la méthode intraveineuse sera réservée aux opérations courtes et mineures. L'éther est toujours recommandable, mais nous avons mieux avec le protoxyde d'azote et le cyclopropane en circuit fermé. On peut combiner l'avertin au cyclopropane et le

pentothal au cyclopropane et ainsi diminuer la dose des deux agents. Il faut administrer pendant toute opération majeure du sérum glucosé (anesthésie régionale) ou du sérum salé (anesthésie générale). Parfois, il est utile d'injecter l'association pitressine-éphédrine pour remonter la T.A. ou régulariser la respiration.

La vigilance post-opératoire est essentielle. Alors peuvent intervenir les analeptiques, l'oxygène et les changements de position donnés au malade, etc. Un dossier d'anesthésie doit être exigé. JEAN SAUCIER

INTESTINAL DECOMPRESSION*

(COLLECTIVE REVIEW)

BY GEO. F. SKINNER, M.D., F.R.C.S. (EDIN. & C)

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"DECOMPRESSION in the treatment of intestinal obstruction is the greatest single technical contribution to abdominal surgery of the past ten years".¹ Although this statement from a recent editorial has been repeatedly amplified in the literature with reports of many cases of simple intestinal obstruction treated by suction drainage through an indwelling intestinal tube, yet there still seems to be considerable confusion.

A full recognition of the essential value of reducing the intraluminal tension depends upon an appreciation of the changing emphasis in the relative importance of the possible causes of death in simple intestinal obstruction. Consequently, in attempting to present the rational basis for this treatment it is necessary to summarize briefly the experimental evidence for the actual lethal factor.

The subject must first be classified into (a) simple, and (b) strangulated cases. The simple obstructions include mechanical occlusions of the lumen and the ones in which reduced peristalsis is the most prominent early factor, that is, the so-called paralytic ileus.

In strangulated cases, of course, the cause of death is the loss of viability, necrosis with resulting increased permeability, ulceration, perforation and peritonitis. In the simple ones, if the pressure in the lumen is allowed to become great enough to interfere with the blood supply of a segment, the same process takes place. But if the blood supply has not been interfered with, then the cause of death in simple obstruction is something very different.

Toxæmia.—Until fifteen or twenty years ago

toxæmia was almost universally thought to be the lethal factor. The only question was as to which was the specific poison absorbed from the involved segment of intestine. But since that time much evidence has accumulated to show that there is a definite decrease rather than an increase in the permeability of the wall. Wangensteen² has shown a complete loss of absorption from the obstructed segment until the intraluminal pressure has increased sufficiently to interfere with viability and cause actual necrosis. The toxæmia theory would seem to be upset by this fact.

Fluid and salt loss.—In simple obstruction there is, however, a definite increase³ in secretion from the involved segment. Consequently, with the idea of increased permeability disproved, during the 1920's the focus of attention was shifted from absorption of specific toxic substances to the excess secretion with the resulting loss of fluids and electrolytes.

Experiments during that period showed marked benefit from intravenous replacement of these losses. At that time the chief discussion was on the relative importance of the water, the sodium and the chloride losses,^{4, 5, 6, 7} trying to determine which of these three was the primary factor causing death. However, one curious contradiction remained.

As we all know, the higher the obstruction the earlier the death, but with salt and water replacements it was soon shown that life could be prolonged in high obstruction but not in low small bowel obstruction. That is, in high obstruction the salt and water loss due to excessive intestinal secretion and vomiting seemed to be the all important factor, but not so in lower ileal obstructions.

* Read at the annual meeting of the New Brunswick Medical Association at Campbellton, N.B., August 20, 1941.

Distension.—Starting with these facts, in the early 1930's Owen Wangensteen,⁸ using the following two experiments, seems to have conclusively shown that the actual distension factor is itself the most important cause of death and that therefore treatment primarily should be directed against the steadily increasing intraluminal pressure and the resulting distension.

1. The administration of intravenous saline greatly increases the survival period for dogs with high intestinal obstruction, but has little or no influence on the survival period in low ileal obstruction. If the dogs with ileal obstructions have the lower end of ileum anastomosed to the stomach, the survival time is greatly increased. By allowing the ileal content to empty into the stomach so that it can be removed by vomiting, the high intraluminal tension of the distended lower ileum is now decompressed.

2. If the cervical œsophagus is closed before the ileal obstruction is produced, again the survival time is greatly increased. Not only is the control of distension the important factor, but swallowed air is responsible to a large measure for the increased intraluminal tension.²¹ To quote Wangensteen, "These experiments indicate that complete occlusion of the terminal ileum may be well tolerated if the gut is not allowed to become distended by swallowed air. In effect, therefore, these experiments indicate that the mechanical factor of distension and not a 'toxic factor' accounts for the lethal issue in ileal obstructions."

Taylor, Weld and Harrison,⁹ working in Toronto, came to the same conclusion in 1933 as a result of an entirely different experimental approach.

Thus we have the rationale for continuous gastro-intestinal suction, not only to drain off excessive intestinal secretions, but to aspirate the swallowed air and thus keep down intraluminal tension. Gases form a large part of the content of distended segments and about 70 per cent of these gases are swallowed air. Continuous aspiration has been of great benefit in decompressing distended loops prior to operation and in keeping the intraluminal pressure low after operation.¹⁰

In some cases where the obstruction is largely due to reduced peristalsis and plastic adhesions, so-called paralytic ileus, operation can be avoided entirely by suction; even in the presence of organized adhesions, decompression alone may completely relieve the obstruction.

All earlier attempts to drain the obstructed segment of intestine, whether by the primitive use of needle or trocar, by the more effective enterostomy or by gastro-duodenal tubes, were intended to remove the toxic contents.

For some years acute dilatation of the stomach and intestinal obstruction have been treated by tubes left in the stomach or duodenum, but previously always depending on simple siphonage for drainage rather than on suction. But, since the gastro-intestinal content is a mixture of fluid and gas, siphonage is not really effective. Actual suction for such drainage was first reported in 1925 by Ward¹¹ of San Francisco. He used an apparatus almost identical with that which is now known as Wangensteen suction for decompression, but as is shown by his own words, Ward still thought the chief aim was to combat toxæmia. He wrote as follows, "Large quantities of fluid and gas are suctioned out, bringing with them the toxic material which recent experimental work leads us to believe responsible for the marked symptoms in these cases."

It may seem superfluous to stress the importance of so obvious a part of intestinal stasis as distension, but the fact remains that it is only within the last ten years that distension has been considered the most significant factor, more important than toxæmia and fluid and salt loss. And further, a realization of the essential importance of distension itself is fundamental in the treatment of intestinal obstruction.

"Without doubt the credit for putting this form of treatment on a rational basis belongs to Wangensteen."¹¹

MILLER-ABBOTT TUBE

By the time that Wangensteen suction, with a Levine or other short tube in the stomach or duodenum, had been generally adopted as a part of prophylactic as well as curative therapy for intestinal obstruction, Miller and Abbott¹² produced the tube that bears their name, a long double tube with one lumen for aspiration and one lumen for inflation of the balloon at the distal end.

The use of both long tubes and balloons in the gut had previously been investigated,^{13, 14} but it remained for Miller and Abbott, working on the physiology of the intestine, to combine long tube and inflated balloon, with suction, and thus demonstrate the rapidity with which

a regurgitating and distended small intestine would resume normal function when decompressed. The clinical application of this tube was first reported by Abbott and Johnston in 1938.^{15, 16, 17, 18}

Wangensteen's gastro-duodenal aspiration with a Levine tube will greatly reduce the mortality rate in intestinal obstruction. It is especially useful for prophylactic treatment to prevent post-operative distension and paralytic ileus. But since this method depends on regurgitation, which is a reversal of normal function, it naturally has its limitations in draining the lower segments.

On the other hand, the Miller-Abbott tube, with the same type of suction, re-establishes normal peristalsis and decompresses the tension directly above the obstruction. The latter, therefore, can be depended upon not only to decompress the obstruction much more effectually than does the high aspiration, but it will also localize the lesion. As the gas and fluids are sucked out, the intestinal wall contracts, and, quickly regaining its normal propulsive movement, forces the balloon ahead at the rate of about one foot per hour, down to the obstruction. Then x-ray of the opaque tube, with or without barium, will localize the region of obstruction.

Nutrition is more easily maintained with the Miller-Abbott tube. As it goes lower into the small bowel the upper decompressed portion of the gastro-intestinal tract is capable of absorbing fluid while the suction continues below.

"It safely can be said that a greater reduction in the mortality of intestinal obstructions had been obtained in a decade with this addition of conservative therapy than was attained in five decades when surgical measures of relief alone were available to the patient."¹

OXYGEN THERAPY

During the last ten years two other important therapeutic methods have been developed for the same condition, namely, the inhalation of 95 to 100 per cent oxygen, and drugs to stimulate peristalsis, such as pitressin. The oxygen therapy is only another form of decompression. Since 70 per cent of the gases in the intestine are swallowed air, nitrogen forms the largest part. The diffusion of nitrogen from the intestine depends on the replacement of all nitrogen in the alveoli of the lung by oxygen.¹⁹

According to the law of gases, the diffusion of any gas through a semipermeable membrane is proportional to the difference between its partial pressure upon the two sides of the membrane. Inhalation of pure oxygen necessarily reduces the pressure of nitrogen in the lungs toward zero, so that nitrogen in the blood diffuses into the alveoli; and similarly the resulting reduced partial pressure of nitrogen in the blood allows this gas to diffuse more rapidly from any body cavity such as the intestines, into the blood, whence it is expelled through the lungs. But, if air swallowing continues while oxygen is being breathed, the difference in partial gas pressure between bowel and lung will again be lost for the nitrogen in the bowel will be displaced by oxygen as well as that in the lung.

Such oxygen decompression for even short periods is effective in the presence of only moderate distension, for all absorption depends on good circulation; but once direct aspiration by suction has relieved the pressure sufficiently to allow improved blood supply, then decompression will be accelerated by oxygen inhalation.

Pitressin, on the other hand, acts by further increasing intra-intestinal pressure. Consequently, this also can be effective in the presence of only moderate distension. Pitressin is most useful for a slightly distended colon because here the additional increase of tension is not so likely to cause further kinking.

BLOOD CHEMISTRY

Although fluid and salt depletion from suction may be no greater than from vomiting, and less than from an enterostomy, nevertheless these losses must be balanced by intravenous therapy. And further, it should be remembered that every ounce of water allowed by mouth and later withdrawn by aspiration will return as normal saline, thus increasing salt loss. Therefore, in addition to salt by the vein, salt should be given by mouth, either as tablets or by giving all fluids isotonic with saline. In other words, strange as it may seem at first glance, in the presence of suction decompression, water given by mouth causes further dehydration. This water will return through the suction tube as saline thus causing salt depletion. Then the kidneys compensate for the salt loss by elimination of more water.²⁰

In addition to the salt required to make the water taken by mouth isotonic, there is a further depletion, for water stimulates intestinal secretion. This stimulation by water can be well demonstrated in the presence of a small bowel fistula. If only normal saline is given by mouth the loss of intestinal secretions from the fistula is only half what it would be if the same volume of water were given by mouth.²¹

Consequently, in the presence of gastro-intestinal suction there is less danger of giving too much salt than in other conditions in which intravenous injections are given over long periods, and yet, blood chlorides, urine output and possible tissue oedema must be watched closely.^{22, 23}

Plasma loss is even more important. Plasma administration will prolong life in ileal obstruction when saline has no effect,²⁴ but only the relief of distension will increase survival time for long periods. Direct plasma loss from the obstructed segment is great enough to be significant only when the circulation is embarrassed, but the increased intra-abdominal pressure causes indirect plasma depletion by pressure on the inferior vena cava and iliac veins, thus segregating blood in the pelvis and lower extremities. Pressure on the diaphragm also upsets circulation sufficiently to cause further loss of plasma. If the distension is relieved plasma loss ceases, even though the obstruction remains.

Since usually the blood cell loss is negligible, plasma replacement is better than whole blood and at times should be administered in large volumes. The replacement of plasma is as essential as any other therapeutic measure, with the exception of the all important necessity of relieving the intra-intestinal pressure.

CONTRAINDICATIONS

In the presence of strangulation, protracted delay is not advisable, and yet, it is just in this sort of case that decompression is most helpful, provided operation is delayed only for a few hours. The reduction of intraluminal pressure prior to operation will make the operative procedure much easier for both patient and surgeon. After operation suction drainage applied to the proximal segments will protect the intestinal sutures from tension sufficiently to make possible single stage resections with primary sutures, where previously multiple

stage procedures with exteriorization were necessary.

The physiology of the ileo-cæcal valve must be mentioned. Since in a large percentage of individuals this valve remains competent²⁵ against back flow, it is impossible to decompress distension of the colon by any type of small bowel aspiration. Intubation methods can do away with most enterostomy operations on the small intestine, but cæcostomy or colostomy still remain the only reliable means of decompressing the colon.

TECHNIQUE FOR INTUBATION

Before intubation a preliminary plain film x-ray should always be taken with the patient upright, to demonstrate the intestinal pattern and fluid levels. This is important, not only to confirm the diagnosis of obstruction but also for later comparisons after decompression has been attempted.

The soft rubber balloon on the end of the Miller-Abbott tube should be tested thoroughly, for without its stimulation the peristalsis either will not carry the tube downward or only very slowly. The distended balloon can be visualized by x-ray.

The method of using the Miller-Abbott tube and especially the technique of passing it through the pylorus has been discussed in several reports, but most completely by Leigh, Nelson and Swenson.²⁶ With the soft rubber balloon collapsed, the double tube is passed through the nose after applying local anæsthetic and lubricant. With the patient swallowing water, it enters the stomach very easily. The balloon should then be filled with 30 c.c. of air and the tube drawn back until the balloon is felt at the cardiac end of the œsophagus. The balloon then is deflated and with the patient lying on the right side, with continuous suction, the tube is very gradually advanced until there is enough length in the stomach to reach the pylorus.

If in a few hours it is still in the stomach, as judged by immediate return of water swallowed by mouth, by the type of aspirated content and by the lack of the tugging sensation on the inflated balloon, then with the aid of a fluoroscope the tube should be placed across the stomach and along the greater curvature towards the pylorus. In this position it will readily pass into the duodenum. Surprisingly little tube is necessary to reach the duodenum,

if not coiled in the wrong direction in the stomach. After the tube is in the duodenum, 15 to 30 c.c. of air are injected into the balloon through one lumen while continuous suction is applied to the other lumen.

The above is the technique usually described, but the following two points, seldom mentioned, have seemed important in our experience. (1) We have found that 10 c.c. of air in the balloon while in the stomach will facilitate its passage through the pylorus. (2) In some of the cases in which difficulty is encountered in passing the tube into the duodenum under the fluoroscope, the tube will be seen always to strike the greater curvature at such an angle as to direct its end upward. In this case the end should be left against the greater curvature with the tube bending slightly toward the pylorus. It will then be carried downward in a few hours, provided only that the amount of tube inserted into the stomach is not sufficient to allow a coiling in the wrong direction.

Some have recommended that the patient lie on the left side, with an inflated balloon and no suction, so as to "float" the balloon through the pylorus; but with the above two points this last suggestion we have found unnecessary.

SUMMARY

1. The rational basis for intestinal decompression has been reviewed.
2. Four indications have been mentioned. (a) Pre-operative; (b) post-operative or prophylac-

tic; (c) complete treatment for simple obstruction due to adhesions; (d) localization of the lesion.

3. Two contraindications have been discussed briefly. (a) Protracted use in the presence of strangulation; (b) colonic obstruction, except for associated small intestine distension.

4. The technique for intubation with the Miller-Abbott tube has been outlined.

REFERENCES

1. REA, C. E.: *Surg., Gyn. & Obst.*, 1941, 72: 670.
2. WANGENSTEEN, O. H.: The therapeutic problem in bowel obstruction, C. C. Thomas, Baltimore, 1937.
3. HERRIN, R. C. AND MEEK, W. J.: *Arch. Int. Med.*, 1933, 51: 152.
4. HARTWELL, J. A. AND HOQUET, J. P.: *J. Am. M. Ass.*, 1912, 59: 82.
5. HADEN, R. L. AND ORR, T. G.: *J. Exp. Med.*, 1923, 37: 365.
6. MCIVER, M. A. AND GAMBLE, J. L.: *J. Am. M. Ass.*, 1928, 91: 1589.
7. FOSTER, W. C.: *J. Am. M. Ass.*, 1928, 91: 1523.
8. WANGENSTEEN, O. H. AND REA, C. E.: *Surgery*, 1939, 5: 327.
9. TAYLOR, N. B., WELD, C. B. AND HARRISON, G. K.: *Canad. M. Ass. J.*, 1933, 29: 227.
10. WANGENSTEEN, O. H. AND PAINE, J. R.: *J. Am. M. Ass.*, 1933, 101: 1532.
11. WARD, R.: *J. Am. M. Ass.*, 1925, 84: 1114.
12. MILLER, T. G. AND ABBOTT, W. O.: *Am. J. M. Sc.*, 1934, 187: 595.
13. EINHORN, M.: *N. Y. M. Jour.*, 1919, 110: 456.
14. JONES, C. M. AND PIERCE, F. D.: *Tr. Ass. Am. Physicians*, 1931, 46: 311.
15. ABBOTT, W. O. AND JOHNSTON, C. G.: *Surg., Gyn. & Obst.*, 1938, 66: 691.
16. JOHNSTON, C. G., PENBERTHY, G. C., NOER, R. J. AND KENNING, J. C.: *J. Am. M. Ass.*, 1938, 111: 1365.
17. JOHNSTON, C. G.: *Surg., Gyn. & Obst.*, 1940, 70: 365.
18. CROWLEY, R. T. AND JOHNSTON, C. G.: *Internat. Abst. Surg.*, 1941, 73: 1.
19. ROSENFELD, L. AND FINE, J.: *Ann. Surg.*, 1938, 108: 1012.
20. PETERS, J. P.: *Ann. Surg.*, 1940, 112: 490.
21. PETERS, J. P., WANGENSTEEN, O. H., ABBOTT, W. O., WHIPPLE, A. O. AND NELSON, J. A.: University of Pennsylvania Bicentennial Conference, 1941.
22. PENBERTHY, G. C., IRVIN, J. L. AND TENERY, R. M.: *Ann. Surg.*, 1940, 112: 530.
23. COLLIER, F. A. AND MADDOCK, W. G.: *Ann. Surg.*, 1940, 112: 520.
24. FINE, J. AND GENDEL, S.: *Ann. Surg.*, 1940, 112: 240.
25. WAKEFIELD, E. G. AND FRIEDEL, M. T.: *J. Am. M. Ass.*, 1941, 116: 1889.
26. LEIGH, O. C., NELSON, J. A. AND SWENSON, P. C.: *Ann. Surg.*, 1940, 111: 186.

THE TREATMENT, PATHOLOGY AND PREVENTION OF MENTAL DISORDERS IN THE AGED*

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FORTUNATELY the treatment of the diseases and infirmities of old age, and consequently their prevention, is a field of therapeutics which is rapidly changing for the better. One uses the word "fortunately" advisedly, for on the one hand, the older age-groups, with their recognized and unrecognized disabilities, are becoming an additional medical and social problem because of the greatly increased life expectancy and rapidly changing social condi-

tions, while on the other hand we continue to accept the recognized illnesses of older people too complacently, and there is a distinctly modern tendency to disregard the assets and virtues of the old. Elderly individuals are expected to carry responsibilities not suited to their capabilities, while skilled and experienced men are retired or refused employment on the basis of increasing age alone. It is a fact that the absolute and relative numbers of patients over 65 years of age newly admitted to mental hospitals is increasing.

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Mental handicap of major or minor degree has come to be accepted as a feature of old age. Too often psychosis at any age is looked upon as incurable, and, on the basis of past experiences the combination of old age with psychosis was undeniably a rather hopeless proposition. Today we know that such is not the case, for certain of these patients are now recovering who did not formerly respond to any recognized therapy. It appears that if we consider the treatments that are effecting these results in the light of contributions from the laboratories and clinics of general medicine and psychiatry we may look forward to the prevention of this as well as the other "complications of senescence". The general practitioner works in the larger field where occurs the best opportunity to apply such preventive measures and fortunately is more apt to do so than his specialized confrères whose cases appear more circumscribed.

We might well describe the type of cases that have responded to treatment before considering the treatment itself. It is true that people over sixty are subject to a number of different forms of psychosis. Recurrent episodes as seen in the manic depressive are not uncommon, while heart disease, hypertension and circulatory disorders of the brain are quite characteristic. Although the same principles apply we must exclude these from our discussion because a certain number have always recovered with symptomatic treatment. We limit ourselves then to cases over sixty-five, either suffering from mental disorder of the senile type without physical signs other than those of senility, or elderly patients suffering from severe organic disease, complicated by a psychosis, the two conditions resulting in a grave prognosis because of the age and debility of the patient.

CASE 1

M.F.B., male, age 66 years, admitted October 2, 1940, as a private patient.

Problems leading to admission to a general hospital then commitment to this hospital; severe depression with agitation, insomnia, anorexia and constipation.

Physical examination on admission.—Patient showing some resistiveness, severe malnutrition with dehydration, skin dry, loose and inelastic. Height 5 feet 8 inches, weight 110 lbs. Conjunctivitis, naso-pharyngitis, pyorrhea and tip of tongue bright red. Arteriosclerosis of radial and retinal vessels. Blood pressure 140/80.

Laboratory findings.—Urinalysis, blood and spinal fluid chemistry and serology, and sedimentation rate—normal.

Blood morphology.—Some concentration on admission (dehydration).

History.—The patient was born in England, the youngest of 13 children, of a German family. Although always shy, serious and conscientious, he has been sociable, engaged in a variety of sports, has musical ability and received a good education.

He came to Canada as a young man, married and has one daughter. At the time of the first war he anglicized his German name and was ashamed of his German ancestry. He worked with a large manufacturing concern for 23 years, finally becoming assistant plant manager. With the financial depression of 1929, at age 55, he was discharged just before becoming eligible for pension, along with other older employees. He felt he had been unjustly treated but secured and held another position within a year keeping it until the present illness.

The onset of the present illness was insidious. A year and a half before admission he began to lose weight. Six months later his hands became clumsy and he gave up piano playing. Vegetables caused nausea, and insomnia developed. A month before admission constipation became severe. His daughter became ill and the patient showed no apparent interest in her. His depression and agitation soon became evident. Admission to a general hospital resulted in a thorough search for organic disease and the patient became worse.

Mental examination on admission demonstrated, depression and agitation, ideas of unworthiness, retardation, blocking. Confusion and resistiveness were present. As interviews became more productive, it was found that he had felt insecure for some years because of his age, reduced income and the expense of illness in the family. With the onset of the present war, his nationality again caused him worry.

Differential diagnosis: cerebral arteriosclerosis was suggested by the findings in the retina but the absence of localizing signs, *episodic* emotional or confusional attacks with lucid intervals were against this diagnosis. Involutional melancholia would be a valid conclusion at an earlier age except for the confusion, resistiveness and insight for the rational depression. Early senile dementia was therefore favoured as a diagnosis because of the history of increasing concern over gradually progressive mental deterioration with a final breakdown in physical and mental health that responded slowly and gradually to therapy.

Treatment and progress.—A high caloric fluid diet (spoon fed); cod liver oil and dried brewer's yeast (two tablespoonfuls each daily) and cevitic acid, 100 mg., mild sedation at night and cascara relieved the dehydration and constipation within two weeks, then the addition of thiamin chloride 20 mg. subcutaneously and nicotinic acid, 50 mg. daily by mouth, quickly resulted in a loss of the mental confusion. Strychnine and insulin (10 units 1 hour A.C. T.I.D.) resulted in a good appetite and he fed himself. However, the retardation, agitation and depression were not at all improved until interviews, discussions and occupational therapy helped the patient adjust himself to his problems.

The needed extraction of teeth was done and plates fitted during the convalescent period.

The patient was sent home recovered on December 7th, two months after admission.

CASE 2

J.M., male, age 72 years, admitted November 16, 1940, as a private patient.

Problems leading to commitment to mental hospital: patient retired from business with economic independence following an emergency herniotomy at 64 years of age. A ruptured diverticulum of the sigmoid resulted in a faecal fistula and a colostomy at 65 years of age with closure of the colostomy the following year.

Patient lived alone with his wife, who died six months prior to the patient's admission. The patient attempted to care for his wife for some weeks during her final illness. He prepared meals and seldom obtained sufficient sleep, as he became more apprehensive of her condition. He was depressed at the loss of his wife in early May and continued to live an unnecessarily lonely and frugal

existence. In June he was admitted to a general hospital in a confusional attack and his condition became progressively worse. Commitment to this hospital was necessary because of his noisy behaviour at night that was dependent upon visual hallucinations. In addition to this he was destructive to linen, incontinent and had developed bed sores.

Summary of physical findings on admission.—(1) Patient 72 years of age, extremely emaciated but not dehydrated. (2) Tongue red. (3) Uncontrolled diarrhoea and urinary incontinence. (4) Moderate emphysema. (5) Enlarged liver and slight jaundice. (6) Huge ventral hernia. (7) Hard mass in the pelvis. (8) Febrile—temperature 101°. (9) Large ulcers over both external malleoli, both greater trochanters and a slough measuring 15 x 8 cm. covering a deep decubitus ulcer over the sacrum.

Mental examination demonstrated severe disturbances of memory, confusion and emotional instability. At times restless or somnolent but not toxic or delirious. Visual hallucinations were not present and may well have been due to previous medication. Diagnosis: senile dementia.

Treatment and progress.—The patient was kept in a continuous flow tub as much as possible for a few days to maintain cleanliness, relieve pressure, clean the ulcers, reduce stench and quiet agitation. During this time and for two weeks he received 50 mg. of thiamine chloride hypodermically and 100 mg. of nicotinic acid by mouth, as well as moderate doses of sedative (nembutal, grs. 1½ or sodium barbital grs. x) as well as morphine. Colonic irrigations relieved the faecal masses noted on physical examination. The largest ulcer was treated by packing with powdered sulfathiazol which was not absorbed in the blood stream (traces only) and compared with the other ulcers treated by various other methods, the healing was dramatic. Finally all the ulcers were completely healed.

After two weeks the thiamine chloride was discontinued and yeast concentrates given by mouth. The nicotinic acid was continued till convalescence was advanced and diarrhoea absent, three months after admission. The patient's appetite for a low residue diet was good throughout.

Actual improvement in physical and mental health was definite after two months, then recovery was rapid. The patient was discharged, in excellent physical and mental condition for his age, April 29, 1941, five months after admission.

CASE 3

A.W., female, age 74 years, treated at home during the winter of 1938-39.

Patient had become more and more amnesic and irritable during the latter half of 1938 and for a month had been sleeping poorly, wandered about at night, complaining of noises and almost fell from a balcony. Medical consultation was then decided upon to avoid sending patient to the mental hospital if possible.

Physical findings.—These were not unusual. The patient being elderly, frail, underweight with thinning of the hair and outer third of the eyebrows, pulse slow and blood pressure low for her age. The patient had rheumatoid arthritis of the small joints and was edentulous. She was unable to read because of presbyopia.

Psychiatric findings.—The patient lived with her married son, daughter-in-law, granddaughter (age 5) and single daughter. The family, including in-laws, were devoted to the patient, who originally disliked the daughter-in-law, with whom she spent the day and upon whom she was dependent. The small flat was somewhat overcrowded. The patient was apprehensive of her failing health, felt she was an imposition and was disturbed by auditory hallucinations of children's voices and banging noises at night. Amnesias and confusion were present but not prominent. Treatment consisted of a prescription for one and a half grains of luminal at bedtime and desiccated thyroid gland grains one and a half daily; the daughter to supervise treatment and the daughter-in-law to provide occupational outlets in

the form of local shopping trips and later housework, always seeking the mother-in-law's advice and help. Minor adjustments of the diet were made and, later, correction of the dentures and glasses were provided.

The patient recovered from her mental symptoms and was no longer a problem in the home.

The above cases are fairly representative of many, illustrating that when dealing with the etiology and treatment of mental disorders, environmental as well as specific factors are to be expected. The physical and mental disorders of any individual are interdependent and never isolated phenomena.

In the treatment of mental disorder in the aged the following features may be noted.

1. Environmental and psychiatric; treatment at home is recommended whenever this is practicable and the family well disposed toward the patient. In cases 1 and 2, environmental changes with maladjustment were the primary factors. There were several personal and family maladjustments in the third case that did not prevent home care once recognized. The elderly patients appreciate attention, respect rewards and penalties, need to have conversational opportunities, prefer to help themselves as much as possible and require occupation.

2. The recognition and treatment of physical diseases is important in that even minor conditions such as pyorrhoea, chronic tonsillitis, rectal fissures, varicose veins and so forth, may render the patient quite irritable without causing any specific complaint. The clinical picture, in more serious illness, such as hyperthyroidism and hypothyroidism, pernicious anaemia, diabetes or tuberculosis is usually misleading because the complaints (if any) are poorly stated and the physical findings are only partial or complicated by coincidentals.

3. The personal habits and hygiene of the patient frequently need some simple changes but these should be kept to a minimum. Increased fluid intake and a strychnine tonic are better for constipation than oily laxatives that interfere with an already decreased nutritional absorption, or roughage which may increase constipation in these patients.

4. Medications must be used with the moderation and conservatism recognized as desirable in all therapy of the aged. Barbiturates, chloral hydrate and alcohol in minimum doses are good sedatives but in larger doses create confusion and agitation. Bromides are not recommended and morphine should be used

only for pain, cardiac restlessness or severe diarrhoea.

5. It will be noted that in each case reported above malnutrition was present. This is the rule, in some cases it is apparently the only important factor, but it is true that some senile cases have not responded to adequate nutritional therapy. Malnutrition should be suspected in the presence of moderate loss of weight, secondary anæmia and constipation. More advanced and specific signs such as painful tongue, atrophied or red papillæ, rhagades, conjunctival thickening or inflammation, hyperkeratosis or pigmentation of the skin cannot be expected and will be found only occasionally.

In acute cases it is necessary to supply normal glucose saline, thiamine chloride and liver extract parenterally for a short time. From the beginning of treatment adequate doses of the other available vitamin concentrates (nicotinic and cevitamic acid, vitamin A and D) should be given by mouth in addition to egg-nogs and dried brewer's yeast. When improvement is manifest one should decrease the vitamin concentrates in favour of the dried brewer's yeast (a heaping dessertspoonful in milk or orange juice) and an ample supply of the protective foods (dairy products, eggs, meat, liver, fish and coloured vegetables). Finally the individual can adapt to a simple regular but adequate diet with yeast concentrates to maintain an appetite and A and D concentrates during the winter months. In older patients liquids with adequate salt should take the place of roughage and bulk in other diets.

6. Treatment to be effective in older patients must be supervised. These patients are usually co-operative with the physician, but are frequently incapable of following even simple directions at the beginning of therapy, although this disability may not be obvious.

These clinical experiences throw new light on the pathology of the senile central nervous system. The senile brain shows changes typical of any aging organ, *i.e.*, atrophy of the parenchyma, relative and absolute increase of supporting elements (glia, mesodermal tissue), and increase of lipochrome in the nerve cells. In addition, however, there are changes occurring only in the senile brain, and not in any other senile organ: (1) The argentophile plaques, *i.e.*, small clusters of argentophile amorphous debris in the cortex. (2) Changes of the net of neuro-

fibrils within nerve cells, a thickening with formation of irregular loops and clumps.

It was known for some time that one should not regard all these changes as signs of the biological process of aging only. Cajal (1904) showed that a thickening of neurofibrils occurs during hibernation, and disappears when the hibernating animal is put into a warm environment. Donaggio (1906) showed that artificial cooling of the body of the animal produces these changes and heating it makes them disappear again. Radsolsky (1926) was able to produce the "senile" neurofibrillary changes by extirpation of the thyroid in young animals. Observations in human pathology showed that the neurofibrillary changes originally described by Alzheimer and Simchowicz as typical of senile dementia may occur under certain other conditions. Pezza (1912) saw the same changes in pellagra psychoses. Michailow (1913) observed them in cases of Asiatic cholera. Alexander and Wu (1935) found them in cases with gastro-intestinal infections with terminal cachexia. Von Braunmuhl (1932) had already postulated previous to this on merely theoretical grounds that the neuro-fibrillary changes as well as the argentophile plaques in senile dementia must be due to disturbance of the water equilibrium in a colloidal milieu. From these observations we may conclude that the following factors may cause "senile" neurofibril changes; low basal metabolic rate (thyroidectomy, hibernation, artificial change of temperature), avitaminosis (pellagra cases) and dehydration (Asiatic cholera, gastro-intestinal infections with terminal cachexia). In this connection it is not important which interpretation is quite correct; for instance it may well be that the gastro-intestinal tract infections produce these changes not so much by dehydration as by avitaminosis. Or it may be that thyroidectomy produces the cerebral changes by interference with the water metabolism. The important point is that one is dealing with factors which are frequently but not necessarily connected with old age. In other words, whereas the fundamental process of aging is irreversible and beyond the reach of therapeutic measures, certain additional features of which Alzheimer's neurofibrillary changes are only an anatomical equivalent, are reversible and can be subjected to treatment.

The prevention of mental disorder is a worthy objective but we should not continue to confine

our efforts and limited professional and financial resources to the vast problem of the mental hygiene of childhood. The latter includes the problems of case-finding of the individual problem child and potentially mentally handicapped adult, of the treatment of large numbers of these child guidance cases, of the guidance of the parents, guardians and teachers of these children, as well as children generally, and finally the faith and resource to carry on this work for many years till a medical accounting can demonstrate its undoubted value. The field of prevention presents many immediate advantages when one considers the older age groups. Although the percentage is increasing the absolute number of individuals is less. Many elderly people are already under a physician's care for minor ailments. The gradual failures of the old are more easily predicted and better understood by the laity and the profession than the rapid changes in the developing child.

In many respects the problems of mental disability in childhood and old age are like the faces of a coin, the opposites of direction or the cast and the mould. This is obvious in numerous ways but the problems within the home and the *family* group offer similarities and contrasts of psychiatric importance. Recognition of psychological factors and their adjustment will not cure the mental disorders of old age nor will they alone prevent them. However, cognizance of them and tactful management can seldom be ignored. Moreover, examination of the quoted cases and reflection will emphasize the important point that preventive treatment should begin before "organic" disease is advanced and therefore psychological factors come to the front. This principle applies as much to the preventive medicine of infectious diseases, dentistry and so forth as it does to nervous disorders. A physician must have faith in himself and the confidence of the patient to treat a normal person by anticipating probable disease.

A necessarily brief and non-technical outline and discussion of the psychological process of aging may indicate the common problems. We may throughout bear in mind that mental happiness at all age periods requires certain resources and cannot exist as it were as an unsupported ethereal entity. These essentials include a sense of security, a means of self-expression and an emotional attachment normally between persons but possible between the

person and his work, play, pets or other interests. We will see how all of these "resources" may be lost in the process of the individual's aging.

1. Responsibilities may be too much, too many and of the wrong kind. The aging leader of large enterprises or communities or armies may have his duties forced upon him or may hold tenaciously to his prerogatives. Such situations are seen especially with men, where honourable but none the less forced retirement is ultimately necessary, or the leader dies in harness leaving confusion behind. Recognized psychoses are rare in this group. However, the common acute vascular lesions of the brain even at comparatively early ages, are usually preceded by definite personality changes. These men hold positions too long, with some justification, because of their irreplaceable sagacity, sense of proportion, calm imperturbability and good judgment in personal relationships and times of crisis. Their disabilities involve a decreasing adaptability, a loss of originality and a refusal to adopt the sometimes necessary radical changes. Difficulties result in an increasing sense of frustration, whereas their abilities properly used should lead to greater veneration and self respect.

In the wage-earning group, responsibilities, employment and useful occupation may be terminated far too soon and too suddenly because of business policy or economic depression. Business management recognizes the oncoming higher incidence of disease and the compensation penalties imposed, yet frequently overlooks the advantages of the skill, experience, economy and dependability of the older employee. Pensions, the dole and old-age allowances are sorry, and frequently actually harmful makeshifts.

2. Intrinsic factors tend to insulate the individual from his associates. Health handicaps gradually keep the older person from their former recreational and social activities, while the growing desire for stability in personal habits and routine prevent new outlets.

3. Isolation is brought about extrinsically by changing social customs and methods. This is so evident in rural life where the young adults leave the district, their services not being required on the farm. Social intercourse, both rural and urban, is dispersed and less personal by widened facilities for travel. Infirmities of age are frequently tiresome or even repulsive to others and the actual death of relatives,

friends and contemporaries plays a part in the process.

4. Fear of economic dependence and ill health is a constant emotional strain but not always evident, expressed or even conscious. Sometimes this spurs the individual to ill-advised activity or checks the normal adequate impulses.

Emotional maladjustment with regard to heterosexual relationships are more scattered and diverse than the primitive impulses which motivate them. In women the independence and adulthood of children result in emotional loss if the offspring are away and motherhood, grown old and misdirected, may create "in-law" and grandparent problems if the family circle is intact.

Actual emotional instability or inflexibility are characteristics developing when the time for prevention has already passed but these changes are usually gradual and a long time may pass before repressed impulses result in manifest behaviour disorders.

5. Personality change is a normal function of age, in that experience should beget wisdom as adversity does caution. The ability to remember, to learn and to use language begins to fail definitely between the ages of 40 and 50 years. These may be compensatory and protective changes. However, along with the influences noted above they tend to make the older individual's outside interests more and more general and his concern for personal and intimate things more and more specific. Ultimately social responsibility is lost and replaced by childish selfishness, a natural result of the instinct of self-preservation in neglected and unappreciated age.

6. The physical handicaps of advancing years are psychological hurdles but the physician can expect the development of skin and dental troubles, of bronchitis and heart disease, of gall bladder and urogenital complaints, of herniæ, arthritis and disorders of the special senses. In

fact these illnesses must be the immediate means of contacting the patient. The physician can then through periodic visits aim at maintaining normal metabolism and guard against alimentary limitations, at the same time helping the patient to adjust to his changing needs in regard to security, self-expression and emotional outlets.

SUMMARY

Not all psychoses in the aged should be regarded as incurable. There are indications that preventive medicine will find application in this field. A general review is given of factors contributing to mental disorders of the senile group, which are accessible to therapeutic measures. Certain determining psychological causes can be overcome by readjustment. Contributing nutritional and metabolic factors can be dealt with by conservative use of medication and by diet. Single illustrative case examples are given.

The authors wish to thank Dr. C. A. Porteous, Medical Superintendent of the Verdun Protestant Hospital, for permission to publish these cases.

A bibliography will be supplied on request.

RÉSUMÉ

L'association psychose-âge avancé ne doit plus avoir la signification péjorative du passé. Pour ne pas faire la revue de toutes les psychoses guérissables du vieil âge, nous nous limiterons aux malades ayant dépassé 65 ans et souffrant, soit de troubles mentaux du type sénile, sans signes physiques autres que ceux de la sénilité, soit de maladies organiques graves compliquées de psychose. Trois observations typiques résument les cas les plus fréquents de ces catégories. Dans le traitement des désordres physiques et mentaux des sujets âgés il faut observer soigneusement: 1° les facteurs dûs au milieu; 2° tous les troubles physiques concomitants; 3° les habitudes hygiéniques du sujet; 4° le choix judicieux de la médication; 5° l'état général, et 6° l'évolution attentive du malade traité. Il faut noter que l'abaissement du métabolisme basal, l'hivernement, les changements artificiels de la température, l'avitaminose et la déshydratation peuvent amener des transformations transitoires de la névrologie, accessibles à la thérapeutique. La prophylaxie doit commencer dès l'enfance et se poursuivre dans l'âge adulte. Les changements progressifs dûs au milieu, aux modifications de la personnalité et aux handicaps physiques seront aussi notés afin de les dévier, de les prévenir ou de les rendre supportables.

JEAN SAUCIER

For a crowd is not company and faces are but a gallery of pictures; and talk but a tinkling cymbal, because in a great town friends are scattered so that there is not that fellowship, for the most part, which is in less

neighbourhoods. But we may go further, and affirm most truly, that it is a mere and miserable solitude to want true friends, without which the world is but a wilderness. —Lord Bacon.

THE DIAGNOSTIC VALUE OF THE PLASMA PROTEINS*

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PETERS and Van Slyke²⁹ reviewed this subject in 1931. This paper presents conclusions based chiefly upon study of data published since then and of analyses of the blood of over 200 cases in the Winnipeg General Hospital.

METHODS AND NORMAL VALUES

Proper appraisal of published data needs knowledge of the methods used and proof of accurate use of them; such proof is best provided by data for a series of normal persons. Even if these values differ from those customarily held as accurate they still permit comparisons with the analyst's values for disease conditions. Where no such clue is given to accurate employment of a method needing skill stress cannot be laid on data for non-normal states.

A standard procedure for the estimation of plasma proteins consists in separation by satura-

We have used the method of Cameron, Guthrie and White,⁵ removing fibrinogen by the Cullen-Van Slyke device, separating globulin by half-saturation with ammonium sulphate at room temperature, and determining protein in fractions by a modified Wu-colorimetric method. Globulin is determined by difference between total protein and the sum of the other proteins. For 22 young normal adults, hospital internes and technicians (20 to 35 years of age), our extreme values were: for total protein 6.3 to 7.7 per cent, for albumin 3.7 to 4.7, and for globulin (plus fibrinogen) 1.9 to 3.6 per cent. The good agreement between these ranges of values and those selected by Moore and Van Slyke lead us to believe that our method can safely be employed for clinical work, while it is fairly rapid and easy to carry out. Our data are set out more fully in Table I.

TABLE I.
(NORMAL VALUES)

No. of subjects	Sex	Total protein		Albumin		Globulin		Fibrinogen	
		Extremes	Mean	Extremes	Mean	Extremes	Mean	Extremes	Mean
15	Male	percentage 6.4-7.7	percentage 7.2	percentage 3.7-4.7	percentage 4.3	percentage 1.7-3.3	percentage 2.7	percentage 0.18-0.32	percentage 0.24
7	Female	6.3-7.3	6.8	3.9-4.3	4.2	2.1-2.7	2.4	0.20-0.37	0.26
22	Both	6.3-7.7	7.1	3.7-4.7	4.3	1.7-3.3	2.6	0.18-0.37	0.25

tion with sodium sulphate at 38° C. (Howe¹⁷), and Kjeldahl-determination of protein-nitrogen in the fractions. It is not convenient for routine clinical chemical analysis. Fibrinogen is now usually estimated separately by transformation to fibrin by addition of calcium chloride (Cullen and Van Slyke⁷). Moore and Van Slyke,²⁶ considering the best data then available from use of the standard procedure mentioned, concluded that the normal limits of total protein were 6.2 to 8.0 per cent, of albumin 3.6 to 5.0 per cent, and of globulin (including fibrinogen) 2.0 to 3.5 per cent.

Our figures for fibrinogen are in excellent agreement with the findings of Ham and Curtis,¹⁵ that, as judged by 193 determinations by four groups of investigators, the normal range is from 0.19 to 0.38 per cent, with an average value of 0.25.

Normal values are usually determined on young healthy adults, and their extremes possibly do not apply to a normal population of all ages. Aldred-Brown and Munro¹ have shown, in fact, that values for normal people over a much wider age span (18 to 64 years) show a lower minimal value for albumin and higher maxima for globulin and fibrinogen than do corresponding series for a more restricted age-group of young adults. This is important, since so many hospital patients are middle-aged or elderly.

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Considering the smallness of the actual numbers examined in our own and similar series of normals, the range (somewhat wider than our own) accepted by Moore and Van Slyke, and the results of Aldred-Brown and Munro, we believe that, so far as our own data are concerned, values should not be considered as definitely abnormal unless they are outside the following limits, albumin, 3.5 to 5.0 per cent, globulin, 1.5 to 3.5 per cent, (albumin plus globulin), 5.8 to 7.7 per cent, fibrinogen, 0.15 to 0.40 per cent. These are probably not the true limits of normal values, but present knowledge and methods do not allow the selection of definitely narrower limits.

COMPARISON OF PLASMA AND SERUM VALUES

Addition of oxalate as anticoagulant dilutes plasma through osmotic action. There is some evidence that in clotting albumin can pass from plasma to cells (Lehman and Scott²⁰). Such changes roughly compensate for loss of fibrinogen in clotting, but oxalate sometimes produces an even greater dilution of plasma (Peters and Van Slyke²⁹).

We have made simultaneous comparison of plasma and serum of 7 normal persons and 7 patients. In 10 the total protein did not differ by more than 0.1 per cent, but in the other 4 serum values exceeded those of plasma by from 0.2 to 0.5 per cent, for no ascertained cause. Approximately the same proportion of oxalate was always used, analyses were carried out at about the same time-interval after the blood was taken, and in no case was there appreciable hemolysis. Serum albumin exceeded plasma albumin by from 0.1 to 0.8 per cent, but serum globulin varied from 0.4 per cent greater to 0.2 per cent less. Hence some correction must be applied when normal values based on plasma are used to check figures for patients' sera. In assessing our own data we have not considered them definitely abnormal unless they were outside the following limits: albumin, 3.6 to 5.5 per cent, globulin, 1.5 to 4.0 per cent, (albumin plus globulin), 5.9 to 8.5 per cent.

Few series of normal figures for serum are available. Our own figures for seven persons were definitely higher for albumin and just higher for globulin than those for the corresponding plasmas. Further work is needed to fix the normal limits for serum. Since such limits are known with greater certainty for plasma, in the mean time plasma and not serum

should be analyzed for clinical purposes. Before we realized this we had analyzed a number of sera. Values for these will be found italicized. Probably *neither plasma nor serum values give the absolutely true values for plasma proteins in the circulating blood.*

PHYSIOLOGICAL VARIATIONS

According to Peters and Van Slyke total protein is less in children under 1½ years; Rennie³⁰ could find no appreciable difference in children between the ages of 3 months and 11 years.

Peters and Van Slyke concluded from the data of Salvesen³⁴ and of Bruckman *et al.*,³ that values for globulin (plus fibrinogen) are possibly higher in women. Our results suggest the opposite conclusion, but it is doubtful if any series is large enough to permit a just conclusion as to differences between the sexes.

Albumin falls slightly, to low normal limits, during the last six months of pregnancy; globulin is unaffected (Peters and Van Slyke; Siedentopf³⁵).

FIBRINOGEN

Of the several globulins in plasma fibrinogen is in a class apart. Ham and Curtis¹⁵ conclude from their own and earlier work: Blood of any one normal individual has a relatively constant fibrinogen content, which is not significantly influenced by fasting, ingestion of food, rest, or short violent exercise. Fibrinogen may be low in uncomplicated, untreated pernicious anemia, starvation, and severe liver damage or impairment of liver function. It is increased in pregnancy and by a diet rich in animal protein, but *an increase is one of the most common non-specific responses to a variety of disease conditions, and especially to infections. Variations in fibrinogen are independent of those of the other plasma proteins.*

Our results in somewhat over 100 cases show no disagreement with these findings. The highest value in our series was 1.15 per cent (nephrosis, complicated with rheumatoid arthritis), the lowest 0.08 per cent (subacute yellow atrophy of the liver). Our concern with fibrinogen values has been to give them separate consideration from those of the other proteins. Obviously, their diagnostic value is very limited.

Neither variations in fibrinogen nor in any other of the plasma proteins can be causally related to variations in the sedimentation rate (Ropes *et al.*³²; Davison *et al.*¹⁰).

THE LIMITED IMPORTANCE OF THE
ALBUMIN/GLOBULIN RATIO

Stress has been laid on this ratio. It has been variously calculated; "globulin" sometimes including fibrinogen, sometimes not; figures for both plasma and serum have been used. We exclude fibrinogen in calculating the ratio. Since any error in proper separation of albumin and globulin gives a much greater error in the ratio slight changes in it are of little importance. Normally, it is always distinctly greater than unity. We believe the precise value is of little significance in differential diagnosis. Its use should be limited to the inference of a pathological state, when it approximates to or is less than unity. Table II, from our data, shows that widely differing syndromes can give markedly abnormal values. In the Table "A" signifies albumin, "G" globulin.

TABLE II.
ABNORMAL ALBUMIN/GLOBULIN RATIOS

Case	Condition	(A+G)	A	G	A/G
		per- centage	per- centage	per- centage	
1	Multiple myeloma	13.2	1.6	11.6	0.14
2	Nephrosis	3.3	0.6	2.7	0.22
3	Post-gastrectomy, bronchopneu- monia, influenza, 101.4° F	4.7	1.5	3.2	0.47
4	Cirrhosis of liver with ascites	6.2	2.0	4.2	0.48
5	Hodgkin's disease	7.1	2.5	4.6	0.54
6	Second stage glo- merulonephritis.	3.5	1.4	2.1	0.67
7	Arthritis with dia- betes mellitus	7.1	2.9	4.2	0.69
8	Nutritional oedema	2.9	1.3	1.6	0.81
9	Nephrosis	4.2	2.0	2.2	0.91
10	Cirrhosis of liver with ascites	4.5	2.3	2.2	1.05

THE DATA OF CHOICE FOR DIAGNOSTIC PURPOSES

For purposes of diagnosis it seems most important to consider deviations from normal values of albumin ("A") and globulin ("G"). Figures for total protein, with a variable fibrinogen content, can mislead. Some additional information may be obtained by considering the sum (A + G). Frequently the albumin value is so markedly depressed as to decrease this below normal. However, a slight decrease in albumin is often accompanied by a high normal globulin value, and the sum of the two remains within normal limits.

TYPE AND EXTENT OF ABNORMAL PLASMA
PROTEIN VALUES IN A HOSPITAL POPULATION

We have analyzed plasma (or serum) of 209 patients in the Winnipeg General Hospital. Of these analyses 115 were requisitioned. The remainder were a random selection, made when sufficient material was available from some other test done routinely, and when the technicians had sufficient time. This random series was made to ascertain whether all disease conditions with abnormal protein values were being examined or others could be discovered. The results are summarized in Table III. (For fibrinogen 58 and 48 cases were respectively available.)

TABLE III.
COMPARISON OF A ROUTINE AND A RANDOM SERIES

	Routine cases			Random cases		
	Above normal	Normal	Below normal	Above normal	Normal	Below normal
	per- centage	per- centage	per- centage	per- centage	per- centage	per- centage
Albumin...	3	34	63	1	52	47
Globulin...	8	81	11	8	90	2
Fibrinogen.	37	56	7	35	65	0

Table III shows that the commonest deviation from normal is a low albumin. Abnormal globulin values (high or low) are rare, and high albumin values still more rare. The random selection shows a larger proportion of normal values, but even in this series nearly one-half of the albumin values are low, indicating that if the figures have diagnostic value the number of cases examined might usefully be increased.

We have endeavoured to ascertain the extent to which these abnormal values have diagnostic value by correlating them with established diagnoses when that was possible (and there were not too many complications), and by critical utilization of data in the literature, using criteria mentioned earlier. The chief conclusions are given in the next two sections.

DISEASE CONDITIONS WITH LOW PLASMA
ALBUMIN AND NO HYPERPROTEINÆMIA,
AND RELATED CONDITIONS

The most important of these are (1) oedematous and related conditions, (2) cirrhosis of the liver with ascites and other conditions affecting the liver, (3) infections, and (4) certain cancerous states.

1. *Edematous and related conditions.*—Peters and Van Slyke²⁹ dealt thoroughly with this group and concluded: In *acute nephritis*, if its course be mild, plasma proteins may remain normal; otherwise they slowly fall, the decrease being in the albumin fraction, which may drop to below 2 per cent. Any initial oedema is apparently due to increased capillary permeability associated with the toxic cause of the nephritis. Marked and persistent oedema is found to be associated with plasma albumin below 2.5 per cent. Globulin may be increased, especially if the nephritis is associated with infectious disease.

In *second stage glomerular nephritis*, *nephrosis*, and *amyloid nephrosis* associated with marked albuminuria and oedema, with the latter is found an albumin below 2.5 per cent, and sometimes even below 1 per cent. In *third stage glomerular nephritis*, usually complicated by hypertension, albuminuria persists, but oedema may be absent, and then albumin exceeds 2.5 per cent. Both albumin and globulin may be normal.

In *nephrosclerosis (arteriosclerotic Bright's disease)*, with no renal oedema, and usually but slight albuminuria, plasma proteins are usually normal. In *famine oedema*, especially when associated with protein undernutrition, the oedema also seems to be associated with an albumin value below 2.5 per cent. In malnourished patients with diseases such as tuberculosis or diabetes mellitus albumin is always low. Later data agree. In epidemic dropsy (Chopra *et al.*⁶) and in hookworm disease (Villela and Teixeira³⁶) albumin figures resemble those in nephrosis.

It is to be noted that while the oedema associated with loss of protein or insufficient protein intake requires an albumin value not greater than 2.5 ± 0.2 per cent, the oedema of early acute nephritis and cardiac oedema are not related to the level of plasma albumin.

Twenty of our cases belong to the above categories dealt with by Peters and Van Slyke²⁹; our values agree with their findings, except that in no case was globulin above normal.

2. *Cirrhosis of the liver with ascites and other conditions affecting the liver.*—In 7 cases of cirrhosis of the liver with ascites we found that albumin varied from 1.7 to 2.6 per cent. Globulin was either normal or (in two cases, 4.2 and 4.5 per cent) just above normal. Two cases of luetic cirrhosis with ascites gave similar figures. A single case of biliary cirrhosis showed slightly

low albumin (3.2) and high normal globulin (3.7). Two cases of catarrhal jaundice showed a similar trend (A, 3.2 and 3.5, G, 3.8 and 4.2); a third, recovering, gave normal values. The results in two cases of obstructive jaundice and five of chronic cholecystitis were practically normal. Two cases of acute cholecystitis with gall stones showed depressed albumin (3.0, 3.5) and high normal globulin (3.4, 3.6); in a third values for each were higher (A 3.7, G 4.0).

These findings are in general agreement with earlier statements in the literature (Myers and Keefer,²⁷ Foley *et al.*,¹¹ Butt *et al.*⁴) and indicate that in biliary cirrhosis, catarrhal jaundice, and acute cholecystitis there is a slight tendency towards lower albumin and higher globulin values, and in cirrhosis with ascites the effect on albumin is marked. In all these conditions globulin values rarely exceed maximum normal limits.

3. *Infections.*—As mentioned already, Peters and Van Slyke state that infections increase globulin values in nephrosis. Many infectious conditions depress plasma-albumin values. In correlating our analytical data with case diagnoses any condition complicated by marked infection has needed most careful consideration, since then a low albumin value is almost certainly partly or wholly attributable to the infection. In our cases already cited such infectious condition was absent.

Wiener and Wiener³⁷ found that in mild infections albumin is slightly decreased and globulin unaffected, but that in more severe infections albumin is more markedly decreased and globulin exceeds maximum normal, the increase paralleling the severity of the condition. They showed further that while values are practically normal in uncomplicated diabetes, complications such as gangrene produce the same type of change.

Albumin is low and globulin above normal during the febrile stage of lobar pneumonia; the changes occur promptly after the onset and may persist for some time after the crisis (Moen and Reimann²⁵). In hypertrophic arthritis (non-infectious, or healed infection) plasma proteins are practically normal (Davis⁹) but in atrophic (rheumatoid) arthritis (presumably infectious) there is some tendency to low albumin and increased globulin (Davis, Aldred-Brown and Munro, Ropes *et al.*³²). Some cases of gonorrhoeal arthritis show the same tendency (Ropes *et al.*), which is also exhibited by tuberculous

patients (Jones¹⁹), although in them Peters and Van Slyke attribute the change to malnutrition.

In the rigor stage of malaria albumin is usually below normal (Chopra *et al.*⁶), as also in monkeys experimentally infected with malaria, during acute attacks; quinine accelerates the return to normal values in these experimental animals (Ghosh and Sinton¹³).

In Table IV we illustrate this general tendency by a further series of cases. (In four cases of uncomplicated diabetes mellitus, either untreated or incompletely balanced, values were normal, while it will be shown later that gastrectomy in itself does not affect the plasma proteins.)

TABLE IV.
(INFECTIONS)

Condition	Albumin	Globulin
	percentage	percentage
Biliary cirrhosis; liver abscess with pus.....	1.4	6.4
Post-gastrectomy, broncho-pneumonia, influenza, 101.4° F.....	1.5	3.2
Generalized peritonitis following ruptured appendix, 100° F.....	2.0	3.3
Lobar pneumonia (slight).....	2.5	2.4
Subacute bacterial endocarditis, 100.0° F.....	2.5	1.8
Gastric resection, wound infection, no temperature.....	2.6	3.0
Marked respiratory sepsis.....	3.2	3.8
Diabetes mellitus, gangrene of right foot.....	2.4	2.2
Diabetes mellitus, gangrene infected with hæmolytic streptococci, cirrhosis of liver, 99.3° F.....	2.7	4.9
Diabetes mellitus, ulcerative colitis, pyæmic abscess, 102.4° F.....	2.8	1.0

4. *Certain cancerous states* (excluding multiple myeloma). Kennaway (1924) and Galchi (1924), quoted by Peters and Van Slyke,²⁹ found in advanced cases a slight decrease in albumin and an increase in globulin, which the latter attribute to malnutrition. The recent literature only records scattered observations. Our own series of 14 cases suggests that the effect of cancer on plasma proteins is governed by the degree of systemic change produced by the cancer.

Single cases of lymphosarcoma, carcinoma of the gall-bladder, teratoma of the testis with metastases, and basal-cell carcinoma of the face gave normal values. Results for the other 10 cases are shown in Table V.

The only case exhibiting definitely increased globulin is that of Hodgkin's disease (which perhaps does not truly belong here). The general effect is to decrease albumin. Certain of the patients (*e.g.*, the second, fourth, sixth and ninth cases) undoubtedly exhibited some degree

TABLE V.
(CANCEROUS STATES)

Condition	Albumin	Globulin
	percentage	percentage
Hodgkin's disease (confirmed by biopsy).....	2.5	4.6
Melanotic sarcoma (confirmed by autopsy).....	2.6	2.2
Ca. prostate (and balanced diabetes mellitus).....	3.1	2.9
Ca. head of pancreas (and balanced diabetes mellitus).....	3.3	1.7
Ca. head of pancreas.....	2.9	2.7
Ca. stomach (7 days before operation).....	3.3	3.3
Ca. stomach (1 day before operation).....	2.9	2.0
Ca. stomach (metastases following gastrectomy 10 years earlier).....	2.4	3.2
Ca. liver.....	2.5	1.8
Transitional cell Ca. of throat with cervical metastases.....	2.9	2.1

of malnutrition, but others (*e.g.*, the third and tenth cases) did not, so that a cancerous condition in itself is potentially able to produce a lowered plasma albumin.

It is of interest to note here, also, that three cases of gastric ulcer and one of duodenal ulcer, without complications, gave normal values. In a case of complete gastrectomy for proved carcinoma of the stomach the initial low figure for plasma albumin (2.7) gradually changed to normal within a few weeks, indicating that gastrectomy, in itself, produces no permanent changes in the plasma proteins.

CASES EXHIBITING HYPERPROTEINÆMIA AND RELATED CASES

These can be sub-divided into (a) subacute yellow atrophy of the liver, (b) multiple myeloma, and (c) other conditions.

(a) *Subacute yellow atrophy of the liver.*—The blood of a single case, a girl of 18, was analyzed on five occasions during the last two months of her life. Albumin decreased steadily from 3.1 to 2.0 per cent and globulin increased from 5.9 to 8.0 per cent. Fibrinogen decreased from normal to 0.08 per cent. This single case illustrates the probable range of values. The results of Foley *et al.*¹¹ are similar but less extreme. (Robinson³¹ has reported similar high globulin figures in a case of arsenical hepatitis.)

(b) *Multiple myeloma.*—The plasma protein distribution in this disease may be of two distinct types. In the first the sum of albumin and globulin is normal or slightly high, globulin is normal, and albumin is usually normal but occasionally high. Bence Jones protein is generally present in the urine and sometimes in the plasma. Packalén²⁸ recently reported a case

with *A* 6.0 and *G* 2.9 per cent. From the cooled serum Bence Jones protein crystallized spontaneously, while ultracentrifuge examination indicated that this protein accounted for 10 per cent of the total protein, and thus for the high albumin figure. Similar cases with high albumin values have been reported by Magnus-Levy²² and Hubbard.¹⁸

In the second type there is always hyperproteinæmia. Albumin varies from normal to very low values; globulin is always increased and may be extremely high (due to increased euglobulin). The sera of such cases may be very viscous. Bence Jones protein may be present in the plasma and urine but is often absent. v. Bonsdorff, Groth and Packalén² obtained from a serum of this type a spontaneously crystallizing globulin of molecular weight above 200,000. This was not improbably formed in the myelomata, and may well be the unusual protein causing the marked increase of globulin in these cases.

Magnus-Levy, reviewing 550 cases of multiple myeloma in 1938, stated that satisfactory blood analyses had only been made in 86 of them, of which 58 showed hyperglobulinæmia. A conservative estimate therefore suggests that at least 50 per cent belong to the second type. We have examined three cases, two of the second type, the third with normal values: (1) *A* 0.9, *G* 12.5; no Bence Jones protein in urine or plasma. No albuminuria. (2) *A* 3.9, *G* 7.5; no Bence Jones protein in urine. (3) *A* 4.9, *G* 2.0; no Bence Jones protein in urine; marked albuminuria.

In case 1, although our analyses were made shortly before death, the bone radiological picture was atypical, and the chemical findings were more definitely diagnostic. Autopsy showed multiple diffuse myeloma. The third case was the least advanced, but was confirmed by biopsy.

It is not yet possible to state what is the relationship between what seem to be, chemically, two distinct types of the same disease. A relationship between the pathological globulin and Bence Jones albumin seems probable. Data in the literature, and our own, suggest that the possible extreme values for the plasma proteins are, for type I, albumin 4.0 to 6.0 per cent, globulin normal, and for type II, albumin 4.0 to 1.0 per cent, globulin, from less than 6.0 to more than 12.0 per cent.

(c) *Other conditions.*—In *kala-azar* albumin varies from low normal down to 1.5 per cent, globulin from 3.5 up to 7.5 per cent (Wu,³³ Ling²¹). Globulin values are similar in *schistosomiasis japonica* (Meleney and Wu²³). In *lymphogranuloma inguinale* cases giving a positive Frei test show normal or slightly decreased albumin values, and globulin from 2.0 to 7.0 per cent or higher (Gutman *et al.*,¹⁴ Rosen *et al.*,³³ Howard *et al.*¹⁶). Claims for occurrence of hyperglobulinæmia in leprosy (Frazier and Wu¹²), and fractures of the long bones and similar traumata (Cuthbertson and Tompsett⁸) need substantiation. We have obtained some evidence of a tendency to increased albumin in myxœdema and are examining further cases of this disease. Hyperproteinæmia may occur in conditions producing marked anhydræmia (Peters and Van Slyke²⁹). Globulin is increased during immunization of horses to diphtheria (Peters and Van Slyke; Modern and Ruff²⁴).

CASES PRESENTING NORMAL VALUES

In addition to cases of chronic cholecystitis, diabetes mellitus, and gastric and duodenal ulcers, we have found normal albumin and globulin values in one or more cases of acromegaly, angioneurotic œdema (?), carbuncle in the neck, hæmorrhoids, hypertrophic gastritis with hyperchromic anæmia, kidney stone (not due to hyperparathyroidism), renal glycosuria, neurosis, functional menorrhagia, uncomplicated benign prostatism, multiple prostatic calculi, osteoarthritis, Raynaud's disease, pernicious anæmia, and benign giant-cell tumour of bone. Other authors have similarly reported for Addison's disease, diabetes insipidus, epilepsy, fragilitas ossium, hyperparathyroidism, lupus erythematosus, orthostatic albuminuria, acute tonsillitis, and tuberculous meningitis.

CONCLUSIONS

Albumin and globulin values for plasma and serum from the same blood are not identical; until normal values of the latter have been fixed more definitely plasma should be analyzed.

With an accurate analytical procedure, albumin values within the range 3.5 to 5.0 per cent, and globulin values within 1.5 and 3.5 per cent should not be considered abnormal for plasma. The normal range for fibrinogen can be taken as 0.15 to 0.40 per cent.

Changes in fibrinogen are independent of those of the other plasma proteins. An increase in

fibrinogen is a common non-specific response of little differential significance. Low values are found in pernicious anæmia, starvation, and severe liver damage.

Slight changes in the albumin/globulin ratio have no significance. It is decreased in many disease conditions. A value approximating to unity, or less, merely indicates a pathological state.

The commonest abnormality is decrease in albumin. This is marked in nephrosis, second-stage glomerular nephritis with œdema, nutritional œdema, and cirrhosis of the liver with ascites (while globulin is usually normal). A smaller decrease in albumin, with normal or very slightly increased globulin, is found in many conditions, and much caution is needed in drawing any specific diagnostic conclusion from such decrease. Presence of infection as a complicating factor may well account for it.

Increased albumin (with normal globulin) is uncommon. It is very occasionally found in multiple myeloma, and is possibly sometimes present in myxœdema.

Markedly increased globulin, with normal or low albumin, is found in a large proportion of cases of multiple myeloma, and, in lesser degree, in kala-azar, lymphogranuloma inguinale, and subacute yellow atrophy of the liver.

REFERENCES

1. ALDRED-BROWN, G. R. P. AND MUNRO, J. M. H.: *Quart. J. Med.*, 1935, 4: 269.
2. V. BONSCHORFF, B., GROTH, H. AND PACKALÉN, T.: *Acta med. Scand., Suppl.*, 1937, 89: 347.

3. BRUCKMAN, F. S. et al.: *J. Clin. Investigation*, 1929, 8: 577.
4. BUTT, H. R. et al.: *Arch. Int. Med.*, 1939, 63: 143.
5. CAMERON, A. T., GUTHRIE, J. S. AND WHITE, F. D.: *Canad. M. Ass. J.*, 1936, 35: 22.
6. CHOPRA, A. N. et al.: *Indian J. Med. Res.*, 1934, 22: 171, 561, 571; *idem*, 1935, 23: 253.
7. CULLEN, G. E. AND VAN SLYKE, D. D.: *J. Biol. Chem.*, 1920, 41: 587.
8. CUTHBERTSON, D. P. AND TOMPSETT, S. L.: *Brit. J. Exp. Path.*, 1935, 16: 471.
9. DAVIS, J. S.: *J. Lab. Clin. Med.*, 1936, 21: 478.
10. DAVISON, R. et al.: *J. Lab. Clin. Med.*, 1940, 25: 935.
11. FOLEY, E. F. et al.: *Arch. Int. Med.*, 1937, 60: 64.
12. FRAZIER, C. N. AND WU, H.: *Am. J. Trop. Med.*, 1925, 5: 297.
13. GHOSH, B. N. AND SINTON, J. N.: *Records, Malaria Survey, India*, 1935, 5: 173; through *Chem. Abst.*, 29: 6306.
14. GUTMAN, A. B. et al.: *J. Clin. Invest.*, 1936, 15: 475.
15. HAM, T. H. AND CURTIS, F. C.: *Medicine*, 1938, 17: 413.
16. HOWARD, M. E. et al.: *Am. J. Syphilis*, 1939, 23: 83.
17. HOWE, P. E.: *J. Biol. Chem.*, 1921, 49: 93.
18. HUBBARD, R. S. AND CASE, C. E.: *J. Lab. Clin. Med.*, 1930, 15: 554.
19. JONES, L. R.: *Am. Rev. Tuberculosis*, 1931, 23: 325.
20. LEHMAN, W. AND SCOTT, F. H.: *J. Biol. Chem.*, 1935, 111: 43.
21. LING, S. M.: *Chinese J. Med.*, 1931, 5: 1; *idem: Proc. Soc. Exp. Biol. Med.*, 1930, 27: 247.
22. MAGNUS-LEVY, A.: *Acta med. Scand.*, 1938, 95: 217.
23. MELENEY, H. E. AND WU, H.: *Chinese J. Med.*, 1924, 38: 357.
24. MODERN, F. AND RUFF, G.: *Rev. Argent. biol.*, 1938, 14: 429 (through *Chem. Abst.*, 33: 2970).
25. MOEN, J. K. AND REIMANN, H. A.: *J. Clin. Investigation*, 1933, 12: 589.
26. MOORE, N. S. AND VAN SLYKE, D. D.: *J. Clin. Investigation*, 1929, 8: 337.
27. MYERS, W. K. AND KEEFER, C. S.: *Arch. Int. Med.*, 1935, 55: 349.
28. PACKALÉN, T.: *Acta med. Scand.*, 1939, 100: 1.
29. PETERS, J. P. AND VAN SLYKE, D. D.: *Quantitative Clinical Chemistry*, Williams and Wilkins, Balt., 1931, Vol. I, chap. 13.
30. RENNIE, J. B.: *Arch. Dis. Childhood*, 1935, 10: 415.
31. ROBINSON, H. W.: *J. Med. (Cincinnati)*, 1938, 19: 491.
32. ROPES, M. W. et al.: *J. Clin. Investigation*, 1939, 18: 791.
33. ROSEN, I. et al.: *Arch. Dermatol. & Syph.*, 1937, 36: 318.
34. SALVESEN, H. A.: *Acta med. Scand.*, 1926, 65: 145.
35. SIEDENTOPF, H.: *Arch. Gynäkol.*, 1938, 167: 1; (through *Chem. Abst.*, 32: 7094).
36. VILLELA, G. C. AND TEIXEIRA, J. C.: *Mem. Inst. Oswaldo Cruz*, 1930, 23: 50; (through *Chem. Abst.*, 26: 4091).
37. WIENER, H. J. AND WIENER, R. E.: *Arch. Int. Med.*, 1930, 46: 236.
38. WU, H.: *J. Biol. Chem.*, 1922, 51: 33.

ACUTE OTITIC MENINGITIS: CHEMOTHERAPY ADVANCES*

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THE clinical picture of fulminating meningitis following an acute suppurative otitis media is well known to all otologists, and the helplessness with which treatment was approached in these cases in years gone by is still fresh in our minds. It seems an appropriate time to present our results in this field over a period of time, because the splendid improvement in our mortality rate is so striking as to be almost unbelievable. The change from 100 per cent fatal results to 85 per cent recoveries is an advance that merits attention.

I might say that the neurologists and neurosurgeons of the Montreal Neurological Institute deserve much credit, because it is under their watchful care, that these results have been obtained. The otological approach has not changed, but their insistence on full surgical drainage being instituted early in all cases has been a moral support in carrying out the indicated operations. In short, the feeding ground of the bacteria must be cleared away before satisfactory progress can be expected in these cases.

I feel it is most important to establish a diagnosis bacteriologically before commencing

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administration of these powerful drugs. A case which proves this point was one I had last February. A woman, 31 years of age, was admitted to my service with a history of a mild influenzal attack a month previous, followed by localized erysipeloid infection about one ear nine days prior to admission. This lesion cleared up quickly under sulfanilamide in small doses of gr. 40 daily, total dosage of not more than 300 grains. On admission she presented a toxic picture. Temperature 106°, pulse 120, and respirations 24. She was conscious, able to answer questions, etc. Physical examination disclosed that the erysipeloid lesion about the ear had absolutely disappeared. A small palpable gland in the left posterior cervical region was present. The throat showed nothing. Nose was clear. Ears clear. Lumbar puncture was negative. Septicæmia seemed to be the most likely diagnosis, so with this thought in mind sulfanilamide was administered, three doses of 40 gr. each in the next twelve hours. The following morning there was no improvement in the clinical condition. Temperature was still 106°. Blood culture disclosed nothing. A few pus cells in the urine suggested kidney

infection, but this was eliminated as a possible diagnosis. The drug was immediately discontinued, and at the end of forty-eight hours the patient's temperature returned to normal and she left the hospital eight days after admission in good condition. This clearly shows that this was a toxic reaction to the drug.

This review covers 29 cases of acute otitic meningitis treated in the Royal Victoria Hospital and the Montreal Neurological Institute during the period from 1935 to 1940, inclusive. All cases belonging to the chronic suppurative otitis media classification were not included, but only those in which it was definitely felt that acute infection was present. There were several cases in the series which had had some otitis media in years gone by, but in such cases which had been dry for years, it was felt that they should be included in this review. Nearly all these cases were treated in the first instance in the oto-laryngological service, a total of 26 simple mastoid operations having been performed in the group of twenty-nine.

Case 21 was admitted direct to the Montreal Neurological Institute with a history of acute suppurative otitis media eight months previously associated with pertussis, under Dr. W. V. Cone's care, who subsequently performed a left sub-occipital craniotomy with drainage of a cerebellar abscess.

Case 17 was admitted with an acute infection in the right ear treated by paracentesis and a radical ethmo-maxillary exploration, left, was carried out, but no mastoid operation.

Case 24 was admitted with an acute suppurative otitis media, but had a definite circumscribed labyrinthitis and a history of a scarlet fever otitis in childhood, so it was felt wiser to perform a first stage radical mastoid on admission.

Case 19 had a simple mastoid operation performed nine months previous to his fatal admission when he reported with a history of pain in the ear operated on of only four days' duration. Clinically, he pre-

YEAR	SEX	AGE	DIAGNOSIS	SURGICAL TREATMENT	BACTERIOLOGY			CHEMO-THERAPY	REMARKS	RESULT.
					Mastoid	Blood	C.S.F.			
1935										
1	F	36	A.S.O.M., L	S.M.	N.G.	N.G.	N.G.	None	Autopsy Pneumo. III	Died
2	M	7	A.S.O.M. (measles)	S.M.	S.H.B.		Non-S.E.	None	Multiple abscesses Stenb. aur.	Died
3	F	60	A.S.O.M., R	S.M.	Pneumo. III		Pneumo. III	None		Died
4	F	6	A.S.O.M., R	S.M. I S.M. II	S.H.B.	N.G.		None		Died
5	F	23	A.S.O.M., L	S.M.	S.H.B.		S.H.B.	None	Meningitis 12 yrs. 24 hrs. after adm.	Died
6	F	26	A.S.O.M., R Recent preg.	S.M. I S.M. II	Pneumo. III		G.	None	Gredenigo's 3/4 Sub-tural Abs. P. III	Died
7	M	23	A.S.O.M., R	S.M.	No record	Pneumo. IV		None	Mortibund Admis. D - 12 hrs.	Died
8	M	9	A.S.O.M., L	S.M.	S.H.B.		S.H.B.	None		Died
9	M	14	A.S.O.M., R&L	S.M.	S.H.B.		S.H.B.	None	Scar. fever. antitoxin Cisternally.	Died
1936										
10	M	14	A.S.O.M., R	S.M.	S.H.B.			None		Died
11	M	36	A.S.O.M., L	S.M.	Pneumo. III		Pneumo. III	None	Anti-mening. serum Intven. 50cc Intmus. 60cc.	Died
12	M	52	A.S.O.M., L	S.M. I S.M. II			S.H.B.	None		Died
13	M	46	A.S.O.M., R	S.M. I S.M. II	Pneumo. IV			None	R. occip. trepan. Autop Sinus Thrombosis L.	Died
14	F	1/2	A.S.O.M., L	S.M. R&L	H. Infln.		H. Infln.	None	Autopsy-Inf. Sept.	Died
1937										
15	M	15	A.S.O.M., L	S.M. I	S.H.B.		S.H.B.	Frontosil 10cc daily	6 days (no level) Septicæmia	Died
16	F	52	A.S.O.M., R&L	Paracen. R&L			Pneumo. I		Anti-Pneumo. Ser. 30 000 U repeated	Died
17	M	6	A.S.O.M., R As. Pen. Sin.	Paracen. R&L Fr. Eth. Explor.	S.H.B.	S.H.B.	S.H.B.			Died
18	M	13	A.S.O.M., L Old history	S.M., L	S.H.B.	S.H.B.	S.H.B.	Frontosil Frontilin		Recovered
1938										
19	M	68	A.S.O.M., L Latent type	S.M.	Pneumo. III			None	Died 295 days p.o.	Died
20	F	49	A.S.O.M., R&L	S.M., R&L	Pneumo. III		Pneumo. III	Sul-mide Sul-diaz	Died 18 hrs. p.o.	Died
21	F	15	A.S.O.M., R&L Pertussis	L.S. Cran. Cereb. Abs.			Pneumo. I	Sul-mide Frontilin	B. conc. 3.8%	Died
22	M	14	A.S.O.M., L	S.M., I S.M., II	S.H.B.	N.G.	N.G.	Frontilin 40 105 Gra./day	B. conc. 9.7mg%	Recovered
1939										
23	F	5	A.S.O.M., R	S.M.	S.H.B.		N.G.	Frontosil 10- 105 Gra./day	B. conc. 5.0mg%	Recovered
24	F	30	A.S.O.M., R Circumscribed Labyrinthitis	R.M., I & II	S.H.B.		N.G.	Sul-mide Sul-diaz Sul-gr. 100 rect. q4h; S-mide Gra. X /mouth	B. conc. 10.0mg%	Recovered
1940										
25	M	50	A.S.O.M., L	S.M.	Pneumo. III Pneumo. IV			S-mide, Gra. 10 q4h; S-deg. & S-myzoline	Pneu. Ser. 32 B. conc. 6.8mg%	Died
26	F	30	A.S.O.M., R&L	S.M., L&R	S.H.B. S.H.A.		S.H.B.	S-deg. 755. Int & Rect. S-mide 105	B. conc. 8.6mg% CSF " 8.5mg%	Recovered
27	F	33	A.S.O.M., R	S.M.	S.H.B.		S.H.B.	S-deg. 15 q4h 5 dya; 20 gms. S-mide 105	B. conc. 13.1mg% CSF " 7.0mg%	Recovered
28	F	9	A.S.O.M., R Measles	S.M., I S.M., II	S.H.B.		N.G.	S-deg. 7gms; S-mide 105 q4h-8dya; 360	Acute neuritis B. conc. 10.0mg%	Recovered
29	F	7	A.S.O.M., L	S.M.	S.H.B.		N.G.	S-mide 105 q4h-8dya; 405 Selfpyr.	B. conc. 3.0mg% CSF " 2.15mg%	Recovered

sented a typical acute reinfection of the middle ear, but death from meningitis within sixteen hours resulted.

The series shows 14 male patients and 15 female patients, the youngest age being 15 months and the oldest, 68 years. In the first decade there were 10 cases; in the second decade, 4; in the third, 2; in the fourth, 5; in the fifth, 3; in the sixth, 3; and in the seventh, 2.

The bacteriology showed the *S. hæmolyticus* *beta* to be the predominant organism, and this was present in 17 cases (or 58.6 per cent) in the ear or the mastoid (practically always the same). Two of this group showed positive blood cultures while eight cases had positive cerebrospinal fluid. One spinal fluid grew a non-hæmolytic streptococcus from a streptococcus *beta* in the ear. Case 26 had two mastoid operations at an interval of five weeks, when the bacteriological report from the second mastoid showed a *S. hæmolyticus*, Lancefield A, while the original culture had been a streptococcus *beta*. Pneumococcus type III was present in seven cases (or 21.4 per cent of the total).

Case 25 was a pneumococcus, type III on the first admission, but six months later on his fatal reinfection, was pneumococcus, type 32 which was held by the bacteriologists to be not directly related to the original infection. Pneumococcus type IV supplied two cases, pneumococcus type II supplied one, while one pneumococcus organism was not typed, and the *hæmophilus influenzae* appeared in one case. Case 9 throughout life did not give a positive culture, but bacteriology of the autopsy put it into the pneumococcus, type III group.

Case 18, the first successful one in the series deals with a boy, thirteen years of age, first admitted to the otolaryngological service on November 14, 1937, with a history of a cold and headache two weeks prior to admission, with spontaneous rupture of the left ear ten days ago, profuse purulent discharge appearing, severe bitemporal headache on the fourth and fifth nights before admission, sleeplessness in the past twenty-four hours, pain in the head, temperature of 104° F., chills, nausea and vomiting. Past history was that as a baby had ear trouble with discharge, and at the age of six years swelling appeared behind the left ear which subsided without operation but there had been no discharge in the past two years from this ear and none from the right for the past five years. Tonsillectomy and adenoidectomy operation had been done at the age of three. On admission the boy appeared seriously ill. The left ear contained purulent discharge and a pulsating perforation could be seen in the tympanic membrane. The right ear was clear beyond some scarring of the drum due to previous infection. Simple mastoid operation was carried out on November 15th and the typical picture of an acute hæmorrhagic mastoiditis was present. The cortex bled freely. Outer cells very hæmorrhagic with considerable bleeding. A small amount of thin seropus was present in the tip. The dura of the middle fossa

exposed and found healthy. Lateral sinus was exposed and appeared healthy but was incised and bled freely. Culture from the mastoid showed a streptococcus hæmolyticus *beta*. The blood picture showed red blood cells, 5,170,000, hæmoglobin 90 per cent, white blood cells 13,300. On November 17th 5 c.c. of prontosil was given intramuscularly. On November 18th a positive blood culture of hæmolytic streptococcus *beta* was reported. On November 18th prontosil gr. 20, q.4.h. per rectum was commenced. On November 19th Dr. A. R. Elvidge saw the patient in consultation, carried out a lumbar puncture which showed a pressure of 350 mm. with an opalescent spinal fluid which gave a positive culture of streptococcus hæmolyticus *beta* and contained 2,300 white blood cells, 80 per cent being polymorphonuclear cells.

The clinical picture was that of a well established meningitis, stiffness of the neck, positive Kernig bilaterally, while the toxic infectious hallucinatory state of mind was present. On November 20th lumbar punctures q.6.h. were being carried out regularly. Prontosil gr. x, q.2.h. by mouth. Blood concentration 3.5 mg. per cent. Continuous intravenous of 5 per cent glucose saline administered. Patient had two chills. The patient apparently made progress during the next few days, but on November 28th showed signs of severe drowsiness, incontinence of urine, and becoming slightly œdematous, so it was thought wiser to discontinue the intravenous therapy. He was then taking fluids by mouth, but had some vomiting. It was noted that there was weakness of the right side of his face, with marked weakness of the left arm and even more of the left leg. On December 2nd it appeared that a venous thrombosis had taken place somewhere in the right hemisphere, and as it was felt it was possibly caused by some fluid imbalance it was thought necessary to add salt to the diet.

On December 5th the patient was slowly going down hill. He appeared to be living in a vegetative state, getting nasal feeding regularly while all active treatment was stopped. He continued in this condition for some time, and on December 11th it was felt that he was somewhat improved. The left leg was completely paralyzed, but the left arm had some power. On December 15th, a left sub-temporal decompression was done, and established no evidence of intracranial pressure, nor abscess of any size. On December 19th, no change in condition. On December 23rd, no nourishment by mouth for the past two weeks. Makes no sound except when disturbed he gives a curious weird cry. Kept up the nasal feedings, and patient is now developing contractures of arms, but can move his legs. The cerebrospinal fluid was clear at this time. On January 2nd the patient was decidedly better, but the left hæmiplegia persisted, although slowly improving. Plaster casts were applied to the left arm to prevent contracture. On February 8th the patient was discharged from hospital. The speech was slow and mouthed but was articulate. Slight facial weakness persisted, while the left arm was partially paralyzed and the fingers of the left hand moved very little. His personal habits had to be reeducated. He took food as if he were an animal and his previous education so far as personal hygiene, etc., was concerned, was apparently forgotten. Fortunately, the boy had a very patient and intelligent mother who took him home under definite instructions as to how to massage the left arm and leg, and how to carry out his general convalescent care. On April 5, 1938, the patient was seen in the Out Patient Department by Dr. Elvidge who reported that he could raise his left arm to his shoulder. In September, 1938, the boy returned to school and made his grade that year. Some contracture of the fingers of the left hand persisted.

He was seen in December, 1940, when he had developed into a fine, handsome six-footer, weighing 180 lbs. but still with some residual contracture of his left fingers and hand. His mentality is of normal standard.

In thinking over this case during the long treatment, eighty-five days of hospitalization, with weeks of unconsciousness, I often wondered

whether modern science was going too far; but I was wrong, since the boy made such an excellent recovery and can take his place in society with very little handicap.

Case 26 concerns a young married woman of thirty years of age who was admitted to the Montreal Neurological Institute on May 6, 1940, suffering for the first three days with pains in the head, slight head cold, and a bloody discharge from the left ear for the past forty-eight hours, developing quickly after washing her hair and going out for a walk in the evening. She presented a picture of stiffness of the neck, drowsiness, some difficulty with speech, semiconsciousness, with dilated retinal veins and depression of all her reflexes (temperature 101° F.). The left tympanic membrane was perforated with a sero-sanguinous discharge. The throat contained stringy mucus and appeared injected. Lumbar puncture showed cerebrospinal pressure on admission to be 480 mg., opalescent fluid, Pandy three plus, with 1,450 cells, which on culture showed a light growth of *S. hæmolyticus beta*. Cultures from the ear canal showed a heavy growth of streptococcus hæmolyticus beta. X-rays on May 6th showed minimal changes in the left mastoid. On the day of admission paracentesis of the left tympanic membrane was carried out to improve the drainage, but the patient's condition became rapidly worse and twenty-four hours later it was decided to do a simple mastoid operation. Temperature was 105° F. Patient was practically comatose.

Operation disclosed a very extensive pneumatization of the mastoid. Pus was present throughout, but there was no breaking down of the cells. There was no exposure of dura and the sinus plate was intact. On opening this the lateral sinus appeared normal. The patient's condition at the end of the operation was desperate. Pulse was counted at 178, and in an attempt to administer intravenous glucose, cutting down on the blood vessels at the elbow revealed no blood present in fairly large veins. The patient was treated by soludagenan intravenously on admission grams 1, q.4.h., while in one twenty-four hour period she was given grams 2. Gradual improvement took place in her condition. On May 11th soludagenan was discontinued because of toxic manifestations revealed by a falling white blood count to 5,600. The temperature returned immediately to the 105° F. level. The drug was recommenced on May 13th with remission of the temperature to 101° F. Soludagenan was again discontinued on May 16th. On May 18th sulfanilamide was given by mouth, gr. 15, q.4.h. until May 20th when soludagenan was again administered for a period of 72 hours.

No further chemotherapy was administered in this case. On May 25th, otitis media developed in the right ear and spontaneous rupture occurred two days later. Routine treatment was instituted, but the ear continued to discharge profusely until a mastoid operation was carried out on June 10th. A picture very similar to that encountered on the left side was present. From this time onward the patient made a slow but steady recovery. On June 23rd patient had a generalized clonic convulsion which lasted for two minutes. This was considered as evidence of cerebral venous thrombosis. The patient had three seizures on this day, and was given four doses of sodium luminal, totalling grams 2 hypodermically. Following this, patient became temporarily aphasic. A good recovery followed and the patient was kept under luminal gr. 1, b.i.d. On June 24th patient showed some change of character,—thought the other patients were talking about her in an insulting manner, was still aphasic, and had trouble naming certain objects. On June 25th aphasia improved. On June 29th, patient was worried and depressed,—thought her mind was slipping. A slight dizzy spell occurred that day. On July 8th, general condition much improved, up in bed, speech improving slowly. On July 11th another clonic convulsion lasting one minute and fifty seconds, associated with weakness of the left hand, while the aphasia returned and lasted one hour. She made gradual im-

provement and was finally discharged from hospital on July 26th with both middle ears dry and well healed. The wound required small dressings, and she subsequently reported to the Out-Door Department for treatment. Patient was seen in October, 1940, when she appeared to be in good general condition, although still taking luminal.

Case 25 presented some unusual features. Patient had a sudden acute attack of otitis media in his left ear and was seen by me within twelve hours of the onset of pain, when a typical red drum was present. This man had been very deaf in this ear for years. Paracentesis of this drum was carried out several days later, and in the face of continued suppuration a simple mastoid operation was carried out one month later (pneumococcus type III). The bone was sclerotic and gave the appearance of old infection. A perisinus abscess was present, and drained. Patient was discharged from hospital ten days later, apparently in good condition. He was not treated by chemotherapy on his first admission. Six months later he returned with a history of pain and discharge from the affected mastoid ear for the past four days. Definite meningitis was present on admission. He was treated with sulfanilamide and soluble daganan and also given pneumococcus type 32 serum into the sub-arachnoid space but to no avail because his condition rapidly went down hill and he died seven days after admission, the radical operation having taken place within twenty-four hours of his second admission. Thus it would appear that this was one of those pneumococcus type III infections that lingers on and caused his death one hundred and seventy-eight days after the original operation.

Reviewing our results it is evident that in the modern chemotherapeutic agents we have very valuable weapons to combat the infections that develop in the ear and in the mastoid, even in the face of the grave complication of meningitis. In our series, all the cases that recovered however, were due to *S. hæmolyticus beta*, seven of the last eight cases falling into this group. The main drugs we use are sulfanilamide with the streptococcus group, sulfapyridine with the pneumococcus group and soluble daganan when the drug is to be administered intravenously. Sulfathiazole is also in use, but we have not had much experience with it in the severe group of cases. We try to maintain a blood and cerebrospinal fluid concentration of 6 to 8 mg. per cent while we continue forcing fluids freely in these cases with lumbar punctures at regular, frequent intervals. Keeping the fluid intake high, associated with frequent lumbar punctures, seems to enable the patient to have frequent washings of the spinal fluid, and it is important not to allow these chemotherapeutic agents to become too concentrated in the blood because of the danger to the kidneys, which must be carefully watched daily when the drug is being pushed. Apparently the success in the streptococcus group lies in the fact that the spinal fluid remains thinner and does not tend to become as thick as in the pneumococcus group. Careful watch must be kept on the white blood cell count

and we have made a working rule to discontinue chemotherapy if the count falls below 6,000, giving the patient a short rest and then commencing the drug again if the general indication is still present. Frequent blood transfusions seem to be of value in this group of cases, and we are employing this more in recent months with the hope that it will permit pushing the appropriate drug to a fuller extent. It would appear that we have not yet found the solution to the treatment of the pneumococcus type III infections, although we had in the hospital during July, 1940, a patient under the care of Dr. D. H. Ballon who made a successful recovery from a type III pneumococcal infection of the meninges, but as a radical mastoidectomy was done and the middle ear suggested a chronic suppurative otitis media the case was not included in this series. Bacteriological reports in this case persistently reported very light growth of the organisms while in the cases where very heavy growths are reported apparently the thickening of the spinal fluids leads to obstruction and the development of internal hydrocephalus which proves fatal.

SUMMARY

1. The report deals with a series of 29 cases with 8 recoveries from proved streptococcus haemolyticus beta meningitis.

2. The value of the soluble daganan is stressed, because in this form more efficient administration and control of the drug can be carried out.

3. Administration by mouth in the earlier cases produced vomiting which tended to produce uncertainty as to the dosage and how much the patient had retained. The addition of nicotinic acid to this compound seems to have reduced the vomiting and some of the toxic manifestations.

4. Careful attention to the white blood cell count and the condition of the kidneys must be given to all cases under active treatment.

5. Forcing fluids with frequent lumbar punctures is an important step in the treatment.

6. Maintenance of satisfactory chemical level in the blood and cerebrospinal fluid (6 to 8 mg. per cent).

7. Early and accurate bacteriological diagnosis must be established.

I am indebted to Dr. D. H. Ballon, Director of the Department of Otolaryngology of the Royal Victoria Hospital, and my colleagues, for their co-operation and permission to use certain of their cases. I am also indebted to Dr. Wilder Penfield, Director of the Montreal Neurological Institute, and his colleagues, for their substantial contribution to the material that appears in this paper.

ORTHOPTIC TREATMENT OF STRABISMUS*

BY JAMES MCGILLIVRAY, M.D.

Chief of Department of Ophthalmology and Orthoptics, Children's Hospital, Winnipeg

ALTHOUGH the treatment of strabismus should begin when a definite deviation is noted, orthoptic measures can only be instituted when the age of the patient makes co-operation possible. In clinics this is usually at five years, but in private practice one can often begin a little earlier.

At the Outdoor Clinic of the Children's Hospital our procedure does not vary much. First, the age and date of onset are recorded, then, any history of infectious diseases or hereditary factors. The approximate angle, plus or minus, is noted, also, whether the condition is monocular or alternating. Finally, the motility of the eyes is tested. The patient is then turned over to a

nurse, who takes the vision. This is preferably done with a revolving illiterate E chart.

Refraction under atropin follows. The rule is to give esotropes with hypermetropia, a full correction, thus holding in abeyance the accommodation-convergence reflex. Exotropes would be under-corrected, also esotropes with myopia, while myopic exotropes would receive a full correction.

The child is then seated before a synoptophore, where the following data are obtained.

- (a) Objective angle.
- (b) Subjective angle.
- (c) Presence or absence of:
 - Simultaneous perception.
 - Simultaneous macular perception.
 - Hyperphoria.
 - Cyclophoria.
 - False associated fixation.
 - Suppression.
 - Fusion.
 - Stereopsis.

* Round Table Conference at the Seventy-second Annual Meeting of the Canadian Medical Association, Winnipeg, June, 1941.

If single binocular vision is to be attained, it is essential that the child should have approximately normal vision in each eye. To this end we use some form of occlusion on the good eye. If the vision in the deviating eye is one-third or less we use the adhesive patch. Incidentally, for patients of this class the various ocluders offered on the market are a waste of time, and the same can be said of atropin. Occlusion should be maintained until the deviation is reversed. But in children under seven years care must be taken lest the good eye becomes amblyopic. Usually a cover should not remain on without inspection for more than a month. The longer the deviation has persisted, the longer the total occlusion required. If, however, a reversal, and with it an improvement in vision, is not possible in six months the best that can be expected is a cosmetic result. When reversal does come, the lens before the good eye is either stripped, covered with a cellophane patch, or shellacked. The patient is then ready for orthoptic training, and is instructed to return two or three times a week.

Again, seated before the synoptophore, and wearing his correction, the patient is asked if he sees the soldier in the hut, the car in the garage, or, any other Grade I slides—the instrument being adjusted to his angle. If he does, he has simultaneous macular perception. The arms of the instrument are then locked, and lateral swings attempted. Later, duction exercises are introduced by converging and diverging the tubes, the point at which the "break" occurs being noted, *i.e.*, the point where the soldier leaves the hut.

The next step is fusion.

Perhaps the best completed target is a rabbit holding a bunch of carrots, but in one of the complementary pictures he is minus a tail, and in the other the carrots are lacking. The same exercises as in simultaneous macular perception are repeated. The results, however, are different, for, whereas the car will move out of the garage on any slight lateral movement, the fused rabbit will not break so easily. On each successive day the amplitude of fusion is extended, until finally the visual axes reach parallelism.

Not every case, in fact very few, present such a happy and uneventful ending. Anisometropia may prove very difficult; for example, a plus 0.5 sph. in one eye and a plus 3.5 cyl. on the other. Where the differential is even greater, as

in a recent clinic case where the patient accepted -3.50 sph. with a -3.00 cyl. in one eye and a +0.75 sph. with a +1.25 cyl. in the other, single binocular vision was obviously out of the question.

When a child turns his eye in he must experience diplopia, project at a false angle, or suppress. Suppression is very common. It may be partial or complete. For its treatment dissociated objects are used, such as the car in the garage. The angle of the synoptophore is adjusted to somewhere near the patient's angle, and he is prepared mentally by telling him to look for the car *in* the garage. Frequently he will say that he sees the car but that it is to the right of the garage. On converging the tubes so as to bring the car closer to the garage, suddenly he will state that the car has faded out to reappear on the other side. This "black out" is the suppression area. The usual procedures, after telling the child to fix steadily at the garage, are:

1. Increase the illumination on the car as it passes over the suppression area.
2. Flick the slide up and down.
3. Execute short lateral movements, on the theory that a moving object excites more interest than a still one. This is sometimes spoken of as massaging the suppression area.

Usually this fading out, or, crossing over, becomes progressively shorter until finally the car is seen *in* the garage. All movements of the instrument are stopped, and the child is allowed to look for a while at the completed picture. About twenty treatments suffice to overcome suppression. A return of diplopia is a good sign.

Another problem is false associated fixation. This condition is said to exist when the patient, for example, in a convergent strabismus, puts the soldier in the hut, not at his own angle but at zero or a few degrees plus. As to incidence: In a group of 400 cases we had 34, or 8½ per cent. This is considerably lower than that recorded by Pugh with 186 out of 400, or 42 per cent.

The treatment of false associated fixation leaves much to be desired. In our experience only about 50 per cent develop true projection. The synoptophore is of value in stimulating the macular areas, and in breaking up suppression. Patching is important. By this means the child is prevented from using his false, which may slowly be abolished from disuse. Frequently operation is required, and so, when the eyes have been put straight and the patient is passing

through a period of visual reorientation, the orthoptist should make her final bid for fusion. But even if fusion is not attained, the cosmetic result is always worth while. As a matter of fact, to the child or the parent single binocular vision usually means nothing.

After operation, a rare but annoying symptom is persistent diplopia. But what is more disconcerting to the surgeon is that if pre-operative training has not been sufficient his patient may slip back to his old angle.

Another hurdle is "loss of central". In these cases the eye has become so amblyopic that it will not follow the finger or a small flashlight. We had 25 of these. Twenty-three regained fixation, and the average period of treatment was seven months. In this connection it is of interest to note that many writers claim that loss of central cannot be cured.

A condition not to be confused with the above is eccentric fixation. Here, there is a large and obstinate suppression area. When the dominant eye is covered the other still deviates at about the same angle. Vision is low, usually less than 1/10th, and abnormal retinal correspondence becomes absolute. My experience with these cases is that they are hopeless from an orthoptic standpoint.

Finally, there is the problem of vertical and torsional deviations. In the former, the soldier (using Grade I slides) is too high or too low for the hut. In the latter, he is seen to be leaning. Out of a group of 169 cases we had 11 with marked hyperphoria. The treatment consists of:

1. Refraction.
2. Get rid of suppression and false associated fixation.
3. Fusion exercises.

4. Correct lateral deviation, either by orthoptics or operation, or, both.

5. From the observation that a covered eye turns upward, one should patch the hypophoric eye.

In conclusion, a few observations may be in order on the more important devices used in orthoptics. The key instrument is, of course, the synoptophore. It is not only accurate, but it is also a great time saver. Angles, grades of vision, or, suppression can be quickly determined, but frequently a patient will not show the same progress *off* the instrument that he does on it. For the further development of single binocular vision I still like the old style stereoscope with Wellsworth charts. Besides, if one is dealing with a residual angle, it is not difficult to slip in a compensating prism.

Bar reading is also excellent training if one is sure the child is not alternating or moving his head. This exercise can be done at home. No expensive instrument is needed. A pen or a pencil will do, held midway between the eyes and the printed page.

Another very useful instrument is the cheiroscope. It is designed so that the child looking through a pair of plus 8 spheres, secured in a head rest, draws with his right hand a picture thrown on a slanting mirror which acts as a diaphragm visible only to the left eye.

There are many other devices, and they all have a place, if properly controlled, in a well appointed clinic. Slides should be used of those things in which children are most interested. The more colour the better, and exercises should never be continued to the point of boredom or fatigue. This is particularly true of younger children. To them orthoptics should combine all the entertaining features of a picture show and a game.

THE GAME OF GOLF.—Golf is a form of work made expensive enough for business men and doctors to enjoy. It is what letter-carrying, ditch-digging and carpet-beating would be if they all had to be performed on the same hot afternoon. The game is played on carefully manicured grass with little white balls and as many clubs as the players can afford. A golf-course is 18 holes, 17 of which are unnecessary and are put in to make the game harder. A hole is a tin cup in the centre of the green. A green is a small parcel of grass costing about \$1.65 a blade and usually located between a brook

and a couple of apple trees or a lot of unfinished excavation. The game is to get the ball from a given point into each of the tin cups with the fewest number of strokes and the greatest number of words. The ball must not be thrown, pushed or carried. It must be propelled by about \$200 worth of curious looking implements, especially designed to provoke the owner. After the final or 18th hole the golfer adds up the score and stops when he reaches 87. He then has a shower, a pint of rye, sings Sweet Adeline with six or eight other liars and calls it a perfect day.—*Bull. of Vancouver Med. Ass.*, Nov., 1941.

SOME OBSERVATIONS ON THE HISTORY OF ORTHOPTICS*

BY F. A. MACNEIL

Winnipeg

THE question has often been asked, "What is the value of orthoptics in the treatment of squint?" One might answer that question by saying orthoptics is the most important part in the treatment, but others might disagree with this answer.

It seems to me that every form of ocular gymnastics which we employ in the straightening of cross eyes, excepting surgery, is orthoptics, and it is difficult to understand how any case of squint can be treated by surgery alone, excluding orthoptics in some form or another. When we set about the task of straightening cross eyes, our job is not complete if we have not given the patient binocular single vision with fusion, amplitude and stereopsis. This, of course, is the ideal and cannot always be accomplished, but, as I have said, it is the objective we start out for. In many instances, however, we must content ourselves with a cosmetic result only. All the procedures we employ in our endeavours towards attaining these ends including the correction of refractive errors may be placed under the heading of orthoptics, and it is seldom that a case of squint is treated without the employment of one or more of these aids.

Comparisons of cases treated with and without orthoptics have been made in different places from time to time, but I have found it difficult to evaluate them for the reason already stated that I think it is impossible to treat squint by surgery to the exclusion of orthoptics in some form or other, if we are to look upon the art as including all forms of ocular exercise.

Orthoptics is not a new art. In the seventh century, a Greek physician used masks with holes in them to encourage the patients to look straight. His idea was revived by Paré, the great French army surgeon, in the sixteenth century, and at the end of the sixteenth century John Porta wrote a treatise on "Why the two eyes see one object". These men, too, approached near our modern methods of treatment, particularly with reference to occlusion.

The first mention of the sense of fusion is

among the writings of a Jesuit, who, in 1613, attributed the union of images to a common sense, which gives its aid equally to each eye. In 1638 enough was known about perspective for a book to be published on the subject. Coming a little later in 1743, Buffon, a distinguished French scientist, considered the inequality of the two eyes to be the cause of strabismus. He especially endeavoured to show that the unequal impressions of the same objects on corresponding parts of the retina are more disturbing than those of wholly different objects. The one eye would therefore instinctively deviate where there is a great difference between the two eyes. Undoubtedly Buffon was describing aniseikonia, although he did not call it by that name.

In 1865 Javel used the stereoscope in the treatment of strabismus. About the same time the investigations of Donders further explained some of the problems by demonstrating the intimate relationship between accommodation and convergence and drew attention to the rôle played by hyperopia in the etiology of convergent strabismus. This added considerably to our knowledge and understanding of the causes of accommodative strabismus and to the importance of correcting errors of refraction.

Claud Worth, however, in our own time may be considered the father of modern treatment of strabismus. His introduction of the amblyscope about the beginning of the present century, and his elucidation and teaching of the part played by fusion in binocular single vision may well be said to have revolutionized the subject. Little has been added to our knowledge of the etiology and treatment of squint since that day.

Many modifications of and improvements on the amblyscope have come into use in recent years. In the diagnosis and treatment of squint these newer instruments have distinct advantages over the old. I refer especially to the synoptophore, the stereo-orthoptor and the rotoscope. It is true that the enthusiasm which centred around their introduction led to an over-estimation of their value. It is true, too, that their indiscriminate use by irregular practitioners often led to exaggerated and unwarranted claims of results obtained. This tended

* Introduction to a Round-table Discussion on the subject of Squint, Canadian Medical Association Meeting, Winnipeg, June 25, 1941.

to place the practice of orthoptics in disrepute. Nevertheless, prejudices have largely disappeared now and there is scarcely a large centre in the country where well equipped orthoptics clinics are not operating.

If abnormal retinal correspondence plays as important a part in the treatment of strabismus as some authorities think it does, one or other of the newer instruments which I have mentioned is indispensable. There is no doubt that being able to observe the eyes of the patient at all times during diagnosis and treatment is a distinct advantage. The subjective signs or findings can be checked objectively, and these are factors of immense importance. Small degrees of incomitance can be detected by checking the retinal correspondence of either eye alternately when the one eye is fixing.

And here is where the trained technician comes in. Without proper supervision of treatments by someone who thoroughly understands what is to be accomplished, more harm than good is likely to result.

Since the establishment of our orthoptic department at the Children's Hospital here we have found the handling of our squint cases very much facilitated.

Data which are required in arriving at a diagnosis of abnormal binocular muscle balance are recorded and tabulated with greater precision. This is especially useful, as repeated observations over a period of time are essential in the establishment of correct diagnoses and follow up of progress in treatment.

I am sure most of you are familiar with the work which has taken place in England in very recent years in connection with the training of orthoptic technicians. Similar training centres are functioning now in the United States, the latter patterned largely after the British. Licensing boards under the direction of the American Academy of Ophthalmology and Otolaryngology and the American Medical Association have also been set up so that the procuring of well trained technicians has been very much facilitated in the past two or three years.

Case Reports

A CASE OF LOBAR PNEUMONIA WITH BACTERÆMIA CAUSED BY THE HÆMOLYTIC STREPTOCOCCUS

BY R. VANCE WARD

Montreal

In the well merited enthusiasm with which we have greeted the advent of the newer sulfonamide preparations, there has been a tendency on the part of all of us to lose sight of the great therapeutic power of sulfanilamide in infections by the hæmolytic streptococcus. The following case which has come under my personal observation during the past six months illustrates the pre-eminent position of the drug in infections of this type, and presents some interesting points of general management and sulfonamide therapy.

J.S., male, aged 32 years. At two o'clock on the morning of February 22, 1941, I received an urgent call to go to the home of a young man with whom I had had no previous acquaintance, and, on arrival there, found the following situation.

The patient, a young man of thirty-two years, employed as an aircraft worker, had always had rather indifferent health. In early childhood he had had some serious intra-cranial condition which had been described to his family as "both meningitis and infantile paralysis". As the physicians who had cared for him at

this time were both dead long since, it was not possible to obtain any further details of this illness. Although no mental or neurological signs had persisted his school career was somewhat retarded, and, with the exception of short periods spent at odd jobs of light work, he had had no really satisfactory gainful occupation until August, 1940, six months before the onset of his illness. At that time he secured employment at one of the large aircraft manufacturing plants in the vicinity of Montreal, and began the extraordinary life of physical activity which culminated in the illness to be described. He had to arise at five a.m. and travel for nearly two hours on foot, by bus, street car and railway train to reach the plant. He worked for ten hours, retraced his journey, and, for recreation, continued one of the habits of his more leisurely days, long walks in the evening! As nearly as one could determine he had been getting along on an average of five hours' sleep per night.

On the morning of February 20th he had reported to the first-aid man at his place of employment with a slight cold; as he had a slightly elevated temperature he was sent home for that day. He worked as usual, however, on February 21st and felt so well in the evening that he took his customary walk of approximately two miles before retiring for the night.

He was awakened shortly before midnight by very severe pain in the left chest, a symptom which was to control the picture almost until he was well enough to return to work. At the same time, he began to cough up large quantities of thin, frankly bloody sputum. Unlike the thick viscid sputum commonly observed in pneumococcus pneumonia, so thin and copious was his expectoration that in two hours he had soiled three complete changes of bed-sheets and night clothes. At the time of the first consultation at two a.m. he already had slight impairment of resonance and suppressed breath sounds over the whole of the lower lobe of the left lung. He was given a hypodermic for pain, thirty grains of sulfapyridine by mouth, and was instructed to take

TABLE I.

Date Midnight to midnight	Temperature range (Rectal)	White blood count	Sulfonamide dosage	Blood level	General condition
Feb. 22	Normal—104	4,700	Sulfapyridine grains 90		Onset: admission to hospital. Appearance of signs in left chest and of membrane on throat. Positive blood culture. Started on sulfapyridine and pentose nucleotide.
Feb. 23	101-102.4	9,100	90	14.5	Condition very bad. Irrational.
Feb. 24	100-100.4	12,000	60		Pain severe. Throat clogged with membrane. Changed to sulfanilamide. Blood transfusion.
Feb. 25	99.6-101.8		45		
Feb. 26	101-101.6		15		
			Total 300 Sulfanilamide		
			60	5.9	
Feb. 27	99-101		90	13.0	Condition poor. Auricular fibrillation which disappeared in four hours. Blood transfusion.
Feb. 28	99.6-100	35,800	30		Much better. Blood culture negative.
Mar. 1	100-100.6		45		Condition much improved.
Mar. 2	100.2-100.6		15		Improvement maintained. Membrane coming off throat.
			Total 240		
Mar. 3	100.2-100.6				Thoracentesis 20 c.c. clear sterile fluid.
Mar. 4	98.2-100.2				
	Thereafter normal except for an evening spike to 99 2/5 on three occasions.				

another thirty grains which were left for six o'clock. The following morning, although his temperature was normal, there was no relief of the pain and hæmorrhage, and he was only semi-conscious. Accordingly he was admitted to the Private Patients' Pavilion of the Montreal General Hospital about twelve hours after onset.

There we made two important and ominous observations: his white blood count was only 4,700, and the bloody sputum, instead of pneumococci, contained large numbers of *Strept. B. hæmolyticus*. Blood culture taken at this time was positive for the same organism, but, as growth did not occur for four days, we were not certain of this fact until February 26th. By the time he was admitted, there was dullness and frank blowing breathing all over the area of the left lower lobe. At no time during the course of his illness did abnormal signs appear anywhere else in his chest. A tough white membrane was present all over his tonsils, faucial pillars, soft palate and pharyngeal wall within twenty-four hours of onset.

The course of his illness during the most acute part is best described by the following Table, giving details of his temperature, white blood count, sulfonamide dosage and blood level and general condition.

On February 26th, the fifth day of his illness, his condition was extremely bad and there seemed to be no hope whatever that he could recover. We had given sulfapyridine what we considered a fair trial; started within two hours of the onset of the illness, it was pushed aggressively until a level of 14.5 mg. per cent was reached on the third day. Even with the diminution of dosage indicated by this high level, it had not fallen below 5.9 on February 26th, the fifth day of his illness. In view of this lack of response, we changed to sulfanilamide. Two hundred and fifty c.c. of whole blood were given on February 26th, and a similar transfusion on February 27th. On the morning of February 27th he developed auricular fibrillation; three grains of digitalis leaf were given at once, and his heart resumed a normal rhythm four hours later. During that day, he received two ampoules of coramine hypodermically, and digitalis was continued in one and a half grain doses until the evening of February 28th. By that time a total of nine grains had been given and its use was abandoned because of his rapid improvement.

On February 28th, forty-eight hours after sulfanilamide was started, a very marked improvement was noted.

He was conscious, rational and almost cheerful; pain in the chest was somewhat relieved, and the membrane was peeling off his throat and palate. Blood culture taken that day was negative. From then on his course was steadily toward improvement. Signs of a small amount of fluid appeared at the left base, and on March 3rd twenty cubic centimetres were aspirated. The fluid proved to be clear and sterile and contained only a few scattered lymphocytes, so no further aspiration was done.

He was able to leave the hospital and go by ambulance to the Montreal Convalescent Hospital on March 10th, the seventeenth day of his illness. He was allowed up four days later; it is interesting to note that he was weighed that day and found to have lost just one-quarter of his body weight in three weeks, from 140 pounds to 106. He was able to walk to his own home nearby on March 22nd.

Weight and ability to get about steadily increased. His chest took longer to clear than it ordinarily does after a pneumococcus pneumonia, and it was not until May 1st that all post-tussic râles at the left base had disappeared. X-ray taken April 25th showed obliteration of the costo-phrenic angles and adhesions to the diaphragm; slight tenting of the cardio-phrenic shadow and the heart pulled slightly to the left. There were, however, no abnormal shadows in the parenchyma.

On May 20th, having attained a weight of 126 pounds, he started back to work on a very much modified regimen of rest during his leisure hours. At last reports in August he had continued to gain weight all through the summer in spite of hard work and long hours.

SUMMARY

This case presents the following interesting and instructive features:

1. The clinical course was somewhat different from that of a pneumococcus pneumonia, in that the onset was even more abrupt and resolution longer delayed.

2. After we had apparently failed to produce improvement with sulfapyridine, prompt recovery followed the use of sulfanilamide.

3. The successful outcome confirms again the oft-repeated observation that an initial low white cell count, not caused by drug action, is not a bar to sulfanilamide therapy.

4. Although transient auricular fibrillation is a common accompaniment of severe infection in those at and beyond middle age, it is the first time we have observed it in one so young.

A THYROID TUMOUR AFFECTING THE PARATHYROIDS

By W. M. TOONE, R.C.A.M.C.

Nelson, B.C.

Mrs. M., aged fifty-two years, was admitted to the Kootenay Lake General Hospital, Nelson, March, 1941. She had stubbed her left large toe six months previously, in October, 1940. The nail had been elevated from its bed and was removed at the time. The wound healed well, but a month later in November she returned with a considerable swelling of the left foot and leg extending to the knee. The foot was very painful especially over the anterior arch on palpation and when putting her foot to the ground. The skin was cold and glossy with the subcutaneous tissues extremely oedematous. It was thought that the patient had developed a post-traumatic osteodystrophy and she was advised to rest the limb. No more was seen of the patient until the day she was admitted to hospital. There was now swelling of both legs, the oedema extending up to the thigh on the left and as far as the knee on the right leg.

In hospital the patient gave the further illuminating information that for the past few years she had been progressively losing weight, had experienced increasing muscular weakness, and of late always felt tired. There were times too when she would become extremely nervous and irritable and often cried without apparent cause. Physical examination revealed a

rounded cystic tumour at the sternal notch and a parathyroid tumour with hyperparathyroidism was suspected.

X-rays were taken of the long bones and skull. These showed an astonishing amount of decalcification but no bone cysts were seen to be present.

The serum calcium was found to be persistently high and the serum phosphorus content of the blood low. Therefore with these data at hand, together with the history and physical findings, a diagnosis of parathyroid tumour was made.

For a week before operation the patient was given a high calcium intake diet with calcium therapy along with viosterol. Operation was performed under avertin and with local anaesthesia. A fairly large cystic tumour, five cm. in diameter, was removed quite easily, a portion of it lying beneath the sternum. The tumour appeared to arise from the isthmus of the thyroid and after careful search no other evidence of disease was found. The post-operative course was uneventful and the patient returned home after one week.

Now the interesting fact of this case with an eye on subsequent history was revealed in the pathological report. Microscopic examination of the specimen did not reveal any parathyroid tissue. It was made up of large colloid filled acini with islets of hyperplastic thyroid gland scattered throughout the stroma. The tumour was encased in a well formed fibrous capsule.

Following up this patient it was found that the swelling of the legs gradually decreased until they appeared normal. The bones took on a normal appearance under the x-ray and the blood calcium and phosphorus returned to normal levels. She gained twenty pounds in two months and stated she had not felt as well for a number of years.

Why she should have made this recovery I am at a loss to explain. The thyroid tumour may have pressed on the parathyroids causing them to be stimulated, but I know of no logical explanation, nor can I understand why she had such tremendous oedema of the legs and what made them return to normal size and shape.

Editorials

THE ASSOCIATION'S OFFER FOR WAR SERVICE

WE publish under our War Section a memorandum prepared by the Canadian Medical Advisory Committee, which we commend to the careful consideration of our readers. It opens, as will be seen, with a survey of the part taken by our Association in Canada's war effort, from the very first day of hostilities—an interesting and encouraging résumé. It shows however that fresh problems are developing. These hinge not only on the supply of medical men, but on their proper selection and placement.

It is a sobering reflection that with more than two years' experience behind us, there should be still such a lack of integration of our efforts. There is no co-ordination of

medical enlistments for the three fighting services, to say nothing of providing for the needs of civilians in case of raids or other grave emergencies.

We can honestly say that our Association has done its best to help, but it has never been anything more than a voluntary advisory body; it has merely given information and advice when asked. It can still do no more than that, but it can at least point out the urgency of the problems to be dealt with. As will also be seen, the plan evolved in Great Britain for dealing with the distribution of medical men, is described and is put forward as worthy of being followed.

H.E.M.

SILENT REVOLUTIONS

WE are not accustomed to associate in our minds the quality of silence with revolution. The seeds of revolution are often sown centuries before seething changes of thought and viewpoint culminate in disorder, violence, bloodshed and gross disorientation. We are beginning to realize, however, that some revolutions come about insidiously, often unobserved by the majority. We are told by those who are concerning themselves with such matters that we are now in the midst of one of these "silent" revolutions. After the War things are to be different. The "Ins" are to be "Out" and the "Outs" are to be "In", and there is to be a general shake-up of the social order, with all that that implies. They warn us, very wisely, that we should acquaint ourselves with what is going on, so that we may guide the new forces, that they do not get out of hand and that injustice is done to none.

One silent revolution is now going on and has been for years, which is important to everybody, and, notably to medical men. It is the matter of the ageing of our population; a greater proportion of our people are reaching the upper rungs of the age-ladder.

Dr. Louis I. Dublin,¹ statistician for the Metropolitan Life Insurance Company, speaking of the United States, states that since 1790, the date of the first census, the population of that country has increased thirty-three times owing to a high birth rate, and heavy immigration. This has made the Americans a very youthful people, characterized by a large proportion of children and young adults and a correspondingly smaller proportion of older persons. Since the beginning of the present century the birth rate, however, has dropped over one-third. Immigration also, has been cut drastically. In fact, during recent years more people left the country than entered it. In a general way these statements may be applied to Canada, except that our country has never experienced such a phenomenal increase in population in so short a time as the United States.

The mortality in the childhood ages, both in Canada and the United States, has been materially cut, owing to improved health conditions, the mortality in the U.S. being only one-fifth of what it was thirty years ago. The result of these factors has been to shift the weight of population structure from youth to the more advanced ages. Taking sixty-five years as the threshold of old age, at the beginning of the century 4.1 per cent of the total population were in this bracket. Today 6.8 per cent of the total come into this group, and it is estimated that by 1980 the percentage will have reached 14.4.

As a result of the rapidly increasing proportion of old people the indications are that the death rate will soon begin to increase. The population will continue to increase, but at a declining rate, until about 1980. Thereafter it will probably diminish, the extent of the decrease being largely dependent on the trend of the birth rates then prevailing.

We can say with some confidence that 30 per cent of the persons attaining the age of sixty-five owe their survival to the advances in medicine and public health as well as to improved standards of living which have become operative since they were born.

The implications of this state of affairs cut wide and deep. The revolution that they imply is going on quietly and irresistibly before our eyes, and may be expected to produce great changes, for better or for worse, in the social, political and medical realms. To avoid disastrous results the situation should be studied speedily and the movements guided so far as it may be possible. We can only deal superficially with the many and varied issues; they are so vast and so intricate.

The increased preponderance of elderly people means that more refuges and convalescent homes, more asylums will have to be provided, and the existing hospitals and out-patient departments will have to be adapted to a different type of clientele. All this will call for a greatly increased expenditure of money. Where is this to be obtained? It is a safe bet to assume that, with the presently popular types of socialistic and paternalistic government it will be drawn

1. DUBLIN, L. I.: Statistical and social implications in the problem of our ageing population, University of Pennsylvania Bicentennial Conference.

by taxation of the well-to-do and more provident classes. The habit of looking to the government for doles of various kinds, once established, is apt to grow. The poor and improvident now, in many cases expect to be spoonfed. Not only so, but they are, even loath to open their mouths to take what is provided for them, as witness the recent admirably and generously planned campaign against diphtheria in the Province of Quebec, where in spite of the facilities provided freely the incidence of the disease has actually increased.

Edward J. Stieglitz,² of the Division of Chemotherapy, National Institute of Health, Washington, D.C., well epitomizes the situation thus.

"Classifying those from ages 20 to 55 as the wage earners or producers, we see that in 1940 almost the total economic responsibility for the Nation falls upon 50.7 per cent of the population, whereas in 1980 only 47 per cent will have to labour and earn to support the rest. This is assuming that the average man will be gainfully employed to the age of 55. It is doubtful if this is the case today. The greatest percentage increase is to be in the group of 65 and over; it is predicted that this fraction of our population will more than double in the next 40 years. Some provision must be made for better utilization of the productivity of the age group from 55 to 65. If these men and women can be included among the earners, the economic load will be more

equitably distributed, with 60 per cent of the population supporting the whole, rather than 47 per cent.

"Either the increasing millions of elderly persons must have the opportunity to work and support themselves or the proportionately dwindling group of younger people will have to support them.

"The one answer implies productivity suited to capacity; the other, destructive cost upon what may ultimately become a minority."

To continue, "The present and impending situations are wholly without precedent. Never before in history has a like problem presented itself." . . . The apparent boon of increased longevity may become a social evil viciously destructive to social economy. . . . Contrariwise, increased longevity can be made an incalculably valuable asset to the community if the potentialities of the aged are wisely guided."

The solution for the difficulty lies not on the surface and will require intensive study. Some think that increased efficiency of the masses, particularly of the younger element will relieve the situation, as Francis Bacon has said, "A man that is young in years may be old in hours, if he have lost no time."

The silent revolution will also show itself among the ranks of the medical profession. Work among children, including preventive medicine, will always be important, but the special ailments of the elderly may be expected to receive more comprehensive attention than ever before. The study of the metabolism in advanced life has, indeed, already received some study.

A.G.N.

2. STIEGLITZ, E. J.: The urgency of gerontology, *Current News of Chemistry and Chemical Engineering*, 1941, 19: 1147.

Editorial Comments

Electro-medical Apparatus and Radio Interference

It has been found necessary to regulate the employment of electro-medical apparatus on account of its effects on radio transmission. For more than 15 years research has been carried on to develop an economic means of suppressing the interference caused by spark-gap diathermy apparatus, the serious effects of which are well known. It is now realized that this interference cannot be filtered out, and that the more elaborate method of completely shielding the room is necessary. This type of regulation has been

enforced in Great Britain and is now to be introduced in Canada.

For the present, the regulations in Canada will not apply to short wave therapy installations, unless they cause serious interference, but it is not unlikely that they will ultimately be extended to include this equipment as well.

These necessary measures have not been put into operation without due warning to the many interests concerned. One year ago notice was given that the regulations would go into force at the beginning of 1942. The plans have been worked out in collaboration with a number of

medical and radio organizations in Canada, Great Britain and the United States and steps have been taken to minimize the hardship to practitioners concerned. At the same time the imperious requirements of the war effort must be recognized.

H.E.M.

Physicians for Civil Service

The Department of Pensions and National Health has asked us to call attention to the establishment of a new Civil Service list of physicians throughout Canada. In anticipation of the demands for medical officers in the Department, applications are invited from qualified medical practitioners, for either full time or part time service. Specialists may be required.

As regards service in the Departmental Hospitals preference in appointment may be given to qualified residents of the Province in which the hospital is situated, and the same principle will apply as regards the Clinical Centres. In the Province of Quebec preference will be given to bilingual candidates where bilinguism is required.

Temporary appointments only may be made at present, but the examination of applicants will qualify for permanent appointment. No definite age limit has been set, but age may be a determining factor in making selections.

In accordance with requirements no male person shall be appointed to Public Service unless he is ineligible for service in the Forces. Any

successful candidate within military age (18 to 45, inclusive) must first be declared unfit for military service by a Military Board.

Application forms for this Department may be had at all city post offices, the offices of the Employment Service of Canada, and the Civil Service Commission, Ottawa.

H.E.M.

L'Union Médicale du Canada

We note with pleasure and interest the appearance of the 70th Anniversary Number of *L'Union Médicale du Canada*. Seventy years is a respectable age for any medical journal; to survive the changes and chances of that length of time is remarkable enough. But *L'Union Médicale* commands our respect not so much for its tale of years as for its youth of spirit. That is what matters in any journal.

The short survey given of its founders and supporters recalls many notable names in Canadian medicine—Georges Grenier with his fiery enthusiasm, to be quenched by tuberculosis so very much too soon, even as in the case of the first Canadian medical editor, Tessier of Quebec; J. P. Rottot, tolerant, wise and trusted; Desrosiers, Hingston, E. P. Benoit, McDonnell; and the present editor-in-chief, Dr. Albert LeSage, whose term of service has extended from 1900. Amongst the contents of this number we note the peculiarly fitting historical note on the Red Cross by Professor E. Saint Jacques.

We would pay our homage to this fine example of medical journalism and extend our best wishes for its continued prosperity.

H.E.M.

Special Article

MEMORIES OF AN ARMY SURGEON

BY ALEXANDRE ACHPISÉ*

Montreal

From a military point of view France lost the war because of unpreparedness and lack of war materials. Our High Command, resting on its laurels of 1914-18, had not seriously considered mechanized warfare and the imperious necessity for tanks and planes.

It may be interesting to recall what preparations our Health Service had made to fight the conflagration. I had the honour, somewhat heavy for one generation, to serve during the war of 1914-18 and also during that of 1939-40. I therefore believe I can speak with some knowledge of the Health Service during the two campaigns.

I wish to state at the outset that the organiza-

tion of these Services during 1939-40 was worthy of all praise and is a credit to our colleagues in the active service. Among the new organizations in the Health Service one of the most interesting was undoubtedly the H.O.E.2 "Hôpital d'Orientation et d'Evacuation secondaire" (Secondary Orientation and Evacuation Hospital). This unit was non-existent during the war of 1914-18.

The first objective of the Health Service was the conservation of the fighting forces. Unfortunately, during war times, it is not a question of putting soldiers back on their feet to send them back home; they must be made well as soon as possible in order to be sent back to the front. As a result, a reversal of values occurs and certain attitudes, though very humane, appear undesirable.

During Great War No. 1, as the Americans say, large, medium and very small auxiliary hospitals had been scattered throughout the French territory behind the Army zones. Every lady wearing a red cross and veil wanted to take

* Former chief of a surgical team in the French Army.

care of "her wounded boys" and it was only natural that she should want to mother these boys as long as possible. I still remember the upheaval in these small centres caused by the arrival of the controlling doctor whose duty it was to send back, where they were needed, those whose departure, through over-solicitude, had been postponed. In other words, the centralization of medical and surgical care which was needed from a military point of view was also recommended from a scientific standpoint. A hospitalization centre would receive technical data, easily control results obtained, and could then apply new methods without any loss of time. This Sanitary Centre would also be managed by doctors whose competency was beyond question.

These, I believe, are the general ideas which led to the organization of H.O.E.2 hospitals. One thing remains to be said.

Where must such a Sanitary centre be set up? Evidently, beyond the immediate proximity of the firing line, so that it can function in all security and not be disrupted by the possible fluctuations of the battle line.

This relative stability is also recommended because of technical installations and the use of equipment rather difficult to transport. It was, after taking all these factors into consideration, that the establishment of H.O.E.2 was fixed at a distance of 200 to 250 kilometres from the battle line. Considering the importance of the organization it seemed advisable to transform a small town into a large Sanitary Centre. This was the solution arrived at by the Health Service.

In September, 1939, I was made Chief of Surgical Team No. 1 at H.O.E.2. Officers, non-commissioned officers and men, as they say in the army, left Vendôme, Ronsard's birthplace and our mobilization centre, on a rainy, foggy autumn morning. Our faces (rendered almost unfamiliar by the steel helmets which we wore), the station and even the Roman spire of the cathedral were but faintly discernible in the dim light. Drowsy and burdened by our battle kit we huddled together in trains which hurried us to an unknown destination.

In the afternoon a note was passed on to us by order of the Colonel: "Destination—Autun".

Most of us recollected the small town of Autun as being the seat of the Diocese of Talleyrand. Others spoke of it as a gastronomical stop-over during a trip from Paris to the Côte d'Azur. And a few scholars spoke of an entrenched Roman camp, under Cæsar, an important town in the Duchy of Burgundy during the Hundred Year war.

The next morning we arrived at Autun, where according to the plans of the general mobilization all the available buildings had been requisitioned: hospitals, both seminaries, barracks, etc., making a total of 3,500 beds. There was another H.O.E.2, which was much larger than ours, that

of Vittel. All the hotels and thermal establishments having been requisitioned, 6,000 beds were made available.

The small drowsy town of Autun became a veritable sanitary hive. Our unit comprised 140 doctors, a few hundred hospital attendants, about 50 nurses—not including the soldiers and civilians requisitioned, both men and women. The small steep streets paved with uneven flagstones swarmed with Parisian doctors who made up the greater part of the medical staff; most of the others being placid Lillois or exuberant Bordelais. The surgeon's cap, with a band of garnet velvet, became the undeniable ornament of the City of Autun. The following incident will bear out this statement. An officer's wife on arriving at the station asked a soldier whether there were many troops stationed in the town; she received the following answer: "Troops, Madame, there are none—but 'majors' enough for resale!"

I would like to point out here that the word "major" in the French Army means any military doctor, without distinction as to rank. Our unit was headed by a Colonel who, through the irony of fate or clever premeditation, was the only doctor from the Active Service. The choice was a judicious one, as much tact, wisdom, pliancy, combined when needs be with rigid military discipline, was required to direct a cohort of so many doctors belonging to a profession whose independence is well-known and whose spirit of criticism was one of the characteristics of pre-war France.

Rendering unto Cæsar what belongs to Cæsar, we, the surgeons, had at our disposal 1,250 beds out of the total of 3,500 at the disposal of the unit.

A chief of service called "Chief of Surgical Team" was placed in charge and these 1,250 beds were served by 5 services, each attending to about 250 beds. The Chief of Team had under his command, an assistant and an anaesthetist assigned to him, for better or for worse, for the duration of the war. In addition, he had at his disposal four to five auxiliary doctors, students in their last year, or young doctors who acted as interns for the various services.

During those stagnant and uneventful months when an abnormal war was at a stalemate, we had at our disposal "Mobile surgical teams", which were also composed of a Chief of team, an assistant and an anaesthetist, and included nurses and a great deal of equipment. Temporarily attached to our H.O.E.2, they remained at the disposal of the Health Service at Headquarters, who by a simple telephone order could despatch them to any section of the front. These teams were composed of young men, about thirty. Many of them took part in the battle of Flanders. Many performed deeds of heroism, operating, and taking care of the wounded during enemy bombardments. The remaining 2,250 beds were divided up between "general medi-

cine" and all the specialties: oto-rhino-laryngology, ophthalmology, neurology, psychiatry, dermatology, stomatology and even surgical facial-maxillary repairs.

The winter of 1939-40 having been particularly hard, and part of the army having been mechanized, the medical services had their hands full taking care of chronic and seasonal ailments, and the surgical services were also in great demand to perform common surgical operations, and especially to attend to road accidents due to blackouts. The equipment in our operating rooms, both septic and antiseptic, consultation rooms and laboratories, and instruments used for fractures can well be described as impeccable. We also had at our disposal separate operating pavilions, built especially for this purpose. The equipment comprised enormous quantities of surgical instruments, anaesthesia and blood transfusion equipment, operating tables, scialitic lamps, large autoclaves, and even a 24-hour central steam sterilization system.

Our hospital attendants, especially those attached to the operating pavilions, most of whom possessed great initiative and intelligence, were trained by us right from the beginning. Working as a team, surgeon, assistant and anaesthetist, always made up of the same human elements, our reciprocal adaptation soon became complete and the results certainly proved worth while. The various hospitals of the unit being spread over the town, each one had its own doctor on duty. On the other hand, the whole unit only had one surgeon on duty for 24 hours. And consequently, as there were no longer any civilian surgeons in Autun, we operated on both soldiers and civilians alike, and even women, while on duty. For instance, on our arrival, being on duty, I was called to the bedside of a woman in a civilian hospital whose condition demanded an emergency operation. Thus, my first operation, as surgeon in the army during this funny kind of war, was on a good bourguignonne from the outskirts of Autun. The poilus of 1914 used to say, "In military life one must not try to understand."

Our H.O.E.2 was not only a nursing unit, it was also a teaching unit. The scientific and technical value of the doctors of the unit were naturally made use of to train young doctors and medical students mobilized as student

officers and destined to fill the ranks of the Health Service. We, therefore, received a batch of 400 young men, whom we trained from both a military and medical standpoint. The old City of Autun again saw the young sons of France who had come to defend her against the eternal invasions of the Germanic tribes, parade within her walls, between its Roman door and its antique temple of Janus. But this youthful conglomeration did not prevent serious work. Two to three times a week we gave conferences or presentations of the injured, each emphasizing his own specialty. This work led to the Medical Society of the Hospitals of Paris or the Academy of Surgery.

The whole aspect of our unit changed over entirely with the progressive approach of the line of battle. Our unit was not moved. In other words, in May and June, 1940, we worked as a unit of the fighting zone. We fell heir to all the surgical emergencies of the war, such as abdominal and thoracic wounds, fractures, traumatic shock, gas gangrene, and we were forced to adopt the "three-eight" schedule, so well known by the surgeons of 1914-18: eight hours during which we operated, eight hours during which we did dressings, eight hours of rest.

The work of Fifth Columnists was felt even in this centre exclusively devoted to the sick and wounded. While we were still in the City and the Germans many dozens of kilometres away, shots were fired on officers and soldiers from the top of buildings. And finally, we were commanded to leave the unit four hours before the Germans entered the town, after evacuating all the wounded and leaving only the dead in their beds.

The desire to do better things, the results obtained, and the technical value of our unit undoubtedly deserved a better fate.

I am reminded of the history of the schools of Autun, in Gaul during the third century A.C., the great crisis in the Roman Empire. The City of Autun after being taken by assault by the barbarians had been sacked and its schools, the first in Gaul, lay in ruins. Order having been re-established, the Governor of Gaul wishing to resurrect them, sent one of the most famous rhetoricians of the times, Eumenius, to open them; he whose speech of inauguration has come down to us.

Who will be the Eumenius of France?

"Fears that shelter life, the black-out, and general conditions of war would have a deleterious effect upon the health of the community have not been realized either in Enfield or in the country at large; Enfield is as healthy as it was before the war. I would find it hard, if questioned, to account for this state of affairs.

I believe it is due in part to the municipal services, the better education of the population in health matters in the years that preceded the war, and the determination of local authorities to continue their health and welfare services in spite of all the difficulties which the war has brought forth."—Dr. D. H. Geffen, M.O.H., Enfield.

Men and Books

HERBA PANACEA*

BY ALBERT G. NICHOLLS,
Montreal

Tobacco's a physician,
Good both for sound and sickly;
'Tis a hot perfume
That expels cold Rheume
And makes it flow down quickly.
(Old song).

This versicle makes wide, if conflicting, claims for the virtues of tobacco, yet specifies only one of the many maladies for the cure of which the weed has been vaunted. Many names have been given to tobacco, among them *Herba Panacea*, *Sacra Herba*, *Sancta Herba*, *Sana Sancta Indorum*, which testify to the esteem in which it was held. A considerable library has been built up about the subject, dealing with it from several angles—botanical, agricultural, chemical, economical, historical, social, literary and medical. We propose to deal only with its historical, literary and medical aspects, with most stress on the last-mentioned. This would seem to be appropriate in a paper presented to a Section of our Association devoted to Historical Medicine.

Smoking, during the three centuries or more that tobacco has been known, has provided inspiration for many literary efforts, some denunciatory, some laudatory. The names of King James the First, Lord Byron, Charles Lamb, Charles Kingsley, and James M. Barrie come at once into mind. Pamphlets, lyrics, dramas, sonnets, essays, romances, all bear witness to the gripping nature of the habit.

Europeans, apparently, made their first acquaintance with tobacco during the first voyage of Columbus to America, and later Spanish explorers comment on the fact that the practice of smoking was wide-spread and some even record having met with snuffing and chewing. The Jesuit missionaries in Canada during the seventeenth century speak of a tribe of Indians called "Petunians" or "Smokers", *petun* being a Brazilian name for tobacco.

The addiction of the Indians to smoking is described by Nicolas Monardes, a notable physician of the University of Seville, who in 1569 published a book on some of the plants that not long before had been brought to Europe from the West. This work was translated into English by John Frampton in 1577 under the title of "Joyfull Newes out of the Newe Found Worlde." We are told that the negroes and Indians after inhaling tobacco smoke "doe remaine lightened, without any wearinesse, for

to labour again: and thei dooe this with so great pleasure that although thei bee not wearie, yet they are very desirous for to do it, and the thyng is come to so muche effect that their maisters doeth chasten them for it, and doe burne the *Tabaco*, because thei should not use it."

It is not certainly known when or by whom tobacco was introduced into Europe. A Spanish physician, Francesco Hernandez, is said to have brought some plants to Spain in 1558 for the inspection of Philip the Second, who had commissioned him to visit Mexico and report on its natural productions. Jean Nicot, Master of the Requests of the French King's Household, was sent to the court of Portugal in 1559 and bought in Lisbon some tobacco seed from a Flemish merchant who had obtained it in Florida. He sent this to the Grand Prior of France and so the plant was originally known as "*Herbe du Grande Prieur*". On his return to France in 1561 Nicot presented some of the plants to the Queen, Catharine de' Medici, and the name was altered to "*Herbe de la Reine*" or "*Herbe Medicée*" in her honour. In the end, however, Nicot's name prevailed and the official title is now *Nicotiana tabacum* and its chief alkaloid is called nicotine.

In France and its adjacent countries tobacco seems to have been cultivated for its supposed medicinal virtues or as a curious garden plant from foreign parts. The same may be true of England to a limited extent, but is certain that the practice of smoking was first popularized in the latter country.

Similar uncertainty seems to exist in regard to the introduction of tobacco into England. Stow, in his "Annals" states that tobacco was brought to that country about the twentieth year of Queen Elizabeth (1577) but John Taylor, called the Water-poet, gives an earlier date. He says "Tobacco was first brought into England in 1565 by Sir John Hawkins." Lobelius, a famous botanist, in his "*Novum Stirpium Adversaria*" (1576), states that "within these few years the West Indian tobacco has become an inmate of England." Of course, the name of Sir Walter Raleigh has been commonly associated with the practice of smoking. Aubrey, the diarist, does not hesitate to say that "He was the first that brought tobacco into England and into fashion." The latter part of this statement is doubtless true, the former, not so certain. There is a lack of preciseness in all this and possibly the chroniclers have confused tobacco, the plant, with the practice of smoking.

Others, on excellent evidence, credit Ralph Lane, the first Governor of Virginia, with being the original English smoker. It is said, also, that Sir Francis Drake brought pipes and

*A paper read at the Seventy-second Annual Meeting of the Canadian Medical Association, Section of Historical Medicine, Winnipeg, June 26, 1941.

tobacco to England and presented them to Sir Walter in 1586. However all this may be, it is certain that Raleigh became a devotee of "the weed", popularized smoking by his example, and gave the practice a good send-off into society. One wonders whether his reprehensible habit did not weigh with King James when that redoubtable author of the famous "Counter-blaste to Tobacco" sent the much greater author of "The History of the World" to the block.

Through the influence of Raleigh and other captains and courtiers the practice of smoking speedily "caught on" and became the vogue among the cavaliers, the tavern habitués, the needy hangers-on, and the young fashionables and roisterers of the time. The rapid and widespread indulgence in the habit may perhaps surprise us. Smoking is an acquired art and at first, at least, calls for the exercise of patience and fortitude, as many of us can recall to our sorrow. As Sir Kenelm Digby in his "Observations on Religio Medici" remarks "Who was ever delighted with tobacco the first time he took it? and who would willingly be without it after he was a while habituated to it?" It may be that the rapid spread of smoking at this early date is to be attributed to the rather human desire to be "in the fashion", and, once started, the soothing effect of the weed contributed to the perpetuation of the practice. King James thought that the habit could be traced to the universal readiness to adopt anything in the way of a novelty and the infatuation of the many who follow the example of the few without troubling to think for themselves. But there must be more to it than this.

From time immemorial the offering up of burnt sacrifices and the use of incense partook of a sacred and religious character, and this thought became ingrained in the beliefs of the people. Here we find one of the origins, at least, of credulity and superstition. Belief in the marvellous and a tendency to accept conclusions on insufficient evidence is a state of mind not yet dead. Perhaps we may apply such considerations to explain the popularity of smoking at the time of its first introduction. The Indians looked upon tobacco as a gift from the Great Spirit, and such was the reverence in which the herb was held by them that they believed the gods themselves used tobacco. Consequently they offered it up as a sacrifice, and when a storm was raging they would throw tobacco leaves into the angry waters to propitiate the offended deities, or under more happy circumstances to secure a bountiful harvest of fish. At first tobacco was used only by their priests, who in the reveries created by indulgence in the weed claimed to read the will of the gods, which in due course they communicated to their followers. Smoking in time became general but to some extent retained its sacred character.

Again, it was the age of supermen, and the adventures of England's heroes in the West no doubt caught the public ear; moreover, we may be sure that the "sailors' yarns" lost nothing in the telling. Tobacco was a sacred plant endowed with marvellous properties and it is not surprising that everybody wished to test it. Accordingly, credulity, curiosity, and, perhaps, snobbishness combined to gain for smoking a good start; the soothing effects of the weed contributed to the perpetuation of the practice. Despite the edicts and fulminations of influential persons, Popes, Czars, Kings, Sultans, and parliaments, smoking gained ground. Fashion, no doubt, played its part. The heyday for those early times seems to have been reached in the reign of Queen Anne. After that the practice of smoking was somewhat deprecated, being relegated to the "lewd fellows of the baser sort." The fashionables took snuff! which method lent itself better to elegance.

Much of the popularity of tobacco was also due to the belief that it was a cure-all. Many extravagant eulogies were written on its efficacy. Richard Burton is a bit satirical and praises it, with reservations:—"Tobacco—divine, rare, superexcellent tobacco, which goes far beyond all the panaceas, potable gold, and philosopher's stones, a sovereign remedy to all diseases! A good vomit, I confess—a virtuous herb—if it be well qualified, opportunely taken, and medicinally used; but as it is commonly abused by most men, which take it as tinkers take all, 'tis a plague, a mischief, a violent purger of goods, lands, health—hellish, devilish, and damned tobacco, the ruin and overthrow of body and soul."

As might, perhaps, be expected tobacco soon became a source of inspiration to the poets. Spenser in his "Faerie Queen" (1590) makes Belpheoe include it with other herbs to heal Timais:—

Into the woods thence-forth in haste she went,
To seeke for herbes that mote him remedy;
For she of herbes had great intendment,
Taught of the Nymph which from her infancy
Her nursed had in true nobility:
There, whether it divine Tobacco were,
Or Panachaea, or Polygony,
She found and brought it to her patient deare,
Who all this while lay bleeding out his heart-blood neare.

And William Lilly, the Euphuist and court poet, in "The Woman in the Moone" (1597) makes Pandora after wounding a lover with a spear send a servant for herbs to cure him:—

Gather me balme and cooling violets
And of our holy herb nicotian,
And bring withall pure honey from the hive,
To heale the wound of my unhappy hand.

Many of the other dramatists of the period have stray references to tobacco, though few of them are lengthy. Ben Jonson, however, in "Every Man in his Humour" makes Captain Bobadil fall into extravagant raptures over the virtues of the weed:—

Sir, believe me upon my relation, for what I tell you, the world shall not reprove. I have been in the Indies where this herb grows, where neither myself, nor a dozen gentlemen more of my knowledge, have received the taste of any other nutriment in the world, for the space of one and twenty weeks, but the fume of this simple only: therefore it cannot be but 'tis most divine. Further take it in the nature, in the true kind: so it makes an antidote, that had you taken the most deadly poisonous plant in all Italy it should expel it and clarify you with as much ease as I speak. And for your green wound—your Balsamum and your St. John's Wort are all mere gulleries and trash to it, especially your Trinidad: your Nicotian is good too. I could say of the virtue of it, for the expulsion of rheums, raw humours, crudities, obstructions, with a thousand of this kind; but I profess myself no quacksalver. Only this much; by Hercules I do hold it and will affirm it before any prince in Europe, to be the most sovereign and precious weed that ever the earth tendered to the use of man.

Beaumont and Fletcher in "The Scornful Lady" give us this dialogue:—

Welford. Do you love tobacco?

Roger. Surely I love it, but it loves not me; yet, with your reverence, I will be bold.

Welford. Pray light it, Sir. How do you like it?

Roger. I promise you it is notable stinging gear indeed. It is wet, Sir: Lord, how it brings down rheum.

Evidently the curate was a feeble smoker, yet desirous of posing as a man of the world.

It may be remarked in passing that, numerous as are the references to smoking in the dramatists of Elizabethan and Jacobean times, Shakespeare never alludes to it, directly or indirectly, though, of course he must have been familiar with the practice. This is another poser for the Shakespearean fans to pore over.

The many virtues of tobacco have been dealt with in lighter verse, notably by Sir John Davies¹, Charles Lamb and Lord Byron. We quote an epigram by the first of these.

OF TOBACCO

Homer of Moly and Nepenthe sings;
Moly, the gods' most sovereign herb divine,
Nepenthe, Helen's drink, which gladness brings,
Heart's grief expels, and doth the wit refine.
But this our age another world hath found,
From whence an herb of heavenly power is brought;
Moly is not so sovereign for a wound,
Nor hath Nepenthe so great wonders wrought.
It is tobacco, whose sweet subtle fume
The hellish torment of the teeth doth ease,
By drawing down and drying up the rheum,
The mother and the nurse of each disease;
It is tobacco which doth cold expel,
And clears th'obstructions of the arteries,
And surfeits threatening death digesteth well,
Decocting all the stomach's crudities;
It is tobacco which hath power to clarify
The cloudy mists before dim eyes appearing;
It is tobacco which hath power to rarify
The thick gross humour which doth stop the hearing;
The wasting hectic and the quartan fever,
Which doth of physis make a mockery,
The gout it cures, and helps ill breaths for ever,
Whether the cause in teeth or stomach be. . .

Again, part of the popularity of tobacco was due to the fact that it was thought to protect against infection, an idea that persisted for long. Pepys in his diary under date of June 7th, 1665, referring to the "Great Plague", has this:—

"The hottest day that ever I felt on my life. This day, much against my will, I did in Drury Lane see two or three houses marked with a red cross upon the doors and 'Lord have mercy upon us', writ there; which was a sad sight to me being the first of the kind that, to my remembrance, I ever saw. It put me in an ill-conception of myself and my smell, so that I was forced to buy some roll-tobacco to smell to and chaw, which took away the apprehension." We are told also that during this dreadful visitation the boys of Eton College were thrashed if they ventured to attend classes without having smoked first.

John Gerarde, a Master Surgeon and a renowned herbalist, gives a very full account of the medicinal virtues of tobacco. His "Herball" (1597) was for long regarded as a reliable textbook on therapeutics and the statements therein were regarded as authoritative. He gives a long list of the ailments for which tobacco is helpful and gives details for its preparation and application. He remarks that "Many notable medicines are made hereof against the old and inveterate cough, against asthmaticall or pectoral griefes, which, if I should set down at large, would require a peculiar volume". We may quote in part, further.

"Nicolaus Monardes saith that the leaves hereof are a remedie for the paine in the head called the Megram or Migraine that hath been of long continuance: and also for a colde stomacke, especially in children; and that it is good against the paines in the kidneies.

"It is a present remedy for the fits of the mother: it mitigateth the paine of the gout if they bee rosted in hot embers and applied to the greeved part.

"It is likewise a remedie for the toothache if the teeth and gummes bee rubbed with a linnen cloth dipped in the juice; and afterward a rounde ball of the leaves laid unto the place.

"The juice boiled with sugar in forme of a sirupe and inwardly taken, driveth foorth woormes of the bellie; if withall a leafe be laid to the navell.

"The same doth likewise scoure and clense olde and rotten ulcers, and bringeth them to perfect digestion, as the same author affirmeth."

Continuing, he says "The weight of fower ounces of the juice purgeth both upwards and downwards", and so cures dropsy.

"The drie leaves are used to be taken in a pipe set on fire and suckt into the stomacke, and thrust foorth again at the nostrils against the paines of the head, rheumes, aches in any part of the bodie." And much else.

Tobacco was also thought to cure syphilis. King James, in his famous "A Counterblaste to Tobacco" (1604) alludes to this. "For tobacco was first found out by some of the barbarous Indians to be a Preservative or Antidot against the Pockes, a filthy disease, whereunto these

barbarous peoples are (as all men know) very much subject . . . so that as from them was first brought into Christendome that most detestable disease, so from them likewise was brought this use of Tobacco, as a stinking and unsavourie Antidot for so corrupted and execrable a Maladie, the stinking Suf-fumigation whereof they yet use against that disease, making so one canker or venime to eat out another. . . ."

The influence of Gerarde did much to establish the reputation of tobacco as a panacea, and the belief was long in dying. Dr. Johannes Vittich, writing much later says:

"There can be no doubt that tobacco can cleanse all impurities and disperse every gross and viscous humour, as we find by daily experience. It cures cancer of the breast, open and eating sores, scabs and scratches, however poisonous and septic, goitre, broken limbs, erysipelas and many other things. It will heal wounds in the arms, legs, and other members of the body, of however long standing."

Count Corti sums up the situation in this somewhat caustic, if amusing, fashion.²

"The plant attracted all the more attention from the fact that it was something new; although the doctors had never heard of it before they began at once to discuss its pros and cons, and to prescribe for it employment as if it had been well known since the time of Galen and Hippocrates. Every doctor, of course, knew better than his colleagues, and it is amusing to note the difference in the methods of treatment they recommended. One was for administering it in its pure state; another would give it mixed with sweet herbs; in one case the patient must take it before, another, after meals; sometimes it must be applied as a poultice, sometimes swallowed like a syrup; one doctor made an oil from it, another, a salve. Dropsy, worms, wasting, swelling, carbuncle, cancer, scabs—there was nothing that tobacco could not cure. But universal remedies are never trusted—as a rule they are worthless. Even in the early years of the seventeenth century there were sceptics, like Scriverius of Haarlem and Francesco de Leyra y Aguilar of Cordova. Nevertheless, most of the medical books of the time spoke with enthusiasm of 'the healing plant', and even the practice of smoking, which was now generally recognized, received the approval of the profession."

With the development of a more critical frame of mind and the lessons derived from experience tobacco gradually fell from its high estate as a panacea for all the ills that flesh is heir to, and, while it gained for a time a limited foothold in certain of the pharmacopœias, it is no longer regarded, officially at least, as having therapeutic virtues.

In the "Thesaurus Medicaminum" of Richard Pearson³ (1810) several indications for the use of tobacco are mentioned. A New Supplement

to the latest Pharmacopœias (1810) by James Rennie⁴ gives a formula for *Vinum Nicotianæ Tabaci*, but adds the caution that tobacco is far from safe. In the British Pharmacopœia⁵ for 1864 (probably the first edition) a short description of tobacco is given but no preparations are mentioned. In the edition of 1867 *Enema Tabaci* is described. This contained 20 grains of tobacco in 8 fluid ounces. "Squire's Companion" for 1867 and as late as 1916 mentions tobacco as an antidote to nux vomica, but, apparently, after 1867 no official preparation of tobacco is listed. Probably the drug was regarded as being too dangerous. Nicotin is mentioned as late as 1924 as being used hypodermically for tetanus and as an infusion for baldness. It is not taken internally.⁶

Scientific investigations on the component parts of tobacco smoke and the effects of smoking have been conducted for some years, and much has been learned, for example, about nicotin, carbon monoxide, and certain volatile agents, but there is still a singular lack of unanimity about their pathological effects, if any. Martindale (*loc. cit.*) states that nicotin nearly equals adrenalin in its power of raising blood pressure.

The practice of smoking is more general now than ever it was and one is tempted to ask What is the allure? In pharmacological language tobacco is characterized as sedative, emetic, diuretic and narcotic. Probably the first mentioned quality largely provides the answer. Lord Bacon opined—"No doubt it hath power to lighten the body and to shake off uneasiness." Smokers vary in their statements, however. Perhaps v. Grimmelshausen, the author of "Simplicissimus",⁷ puts the matter as well as it can be. "One man smokes because it enables him to see better; another, because it disperses water in the brain; a third to ease his toothache; a fourth, to stop the singing in his ears; a fifth will tell you it makes him sleep; a sixth that it quenches his thirst; a seventh, that it neutralizes the bad effects of too much water-drinking; and, eighth, that it expels evil humours; the ninth man smokes to pass the time; the tenth, because he does not wish to be unsociable."

What is the conclusion of the whole matter? Perhaps we are justified in saying that smoking is popular because it is pleasant, soothing, contemplative, and companionable. Like alcohol it is a means of escape, without alcohol's dire potentialities for disaster. Real griefs and annoyances are transmuted into unreal dreams and fantasies, and all is "gas and gaiters", as the demented old gentleman in "Nicholas Nickleby" might have put it.

There is an old adage—*In vino veritas*. May we suggest a new one.

In fumo caritas.

REFERENCES

1. DAVIES, SIR J.: Epigram XXXVI, Christopher Marlowe, J. C. Bullen, Nimmo, London, 1885, 3: 234.
2. CORTI, E. C.: A History of Smoking, George C. Harrap and Co., Ltd., London, 1931.
3. PEARSON, R.: Thesaurus Medicaminum, C. and R. Baldwin, London, 1810.
4. RENNIE, J.: A New Supplement to the Latest Pharmacopoeia, Baldwin and Cradock, London, 1837.
5. The British Pharmacopoeia, Spottiswoode and Co., London, 1864.
6. MARTINDALE, W. H.: A Synopsis of the Principal Changes in the U.S. Pharmacopoeia, London, A. K. Lewis, 1924, p. 845.
7. VON GRIMMELSHAUSEN, J. C.: Satyrischer Pilgrim, 1667, part 2, p. 47.

Association Notes

CANADIAN MEDICAL ASSOCIATION—SEVENTY-THIRD ANNUAL MEETING

JASPER PARK CALLING

During the week of June 15, 1942, the Canadian Medical Association will take over the beautiful Jasper Park Lodge for its seventy-third annual meeting. Those who have been to Jasper will realize how excellently the Lodge lends itself to a convention such as ours, and will wish to be present. Those who go for the first time have a great treat in store for them. The Lodge, built on the cabin system, nestled on the shore of a beautiful lake and surrounded by majestic mountains, is unsurpassed in appointments, scenic beauty and comfort. There is splendid accommodation for 650 people. In every direction, by motor car, saddle pony or on foot delightful excursions may be made.

For those who play golf, Jasper offers the golfers' paradise. There is no finer course in the world.

For several months past Committees have been at work on this meeting, planning for its every detail. A scientific program of a high order has been arranged for Wednesday, Thursday, and Friday, June 17th, 18th and 19th, particulars of which will appear in subsequent issues of the *Journal*. The two preceding days, June 15th and 16th, will be given over to business meetings of the General Council of the Association. Also, on Tuesday, June 16th, the British Columbia Division and Alberta Division of the Association will hold their annual meetings.

For combined scientific profit, healthful recreation and pleasure, this meeting will stand out as an attraction long to be remembered.

Some one asks, "Should medical conventions be held in war time?" The answer is decidedly "Yes". The progress of scientific medicine and the dissemination of medical knowledge are if anything more needed in war time than in peace time. Furthermore, doctors must have occasions to relax if they are to continue to do their best work during these hectic days of war. So the combination of learning and playing at Jasper Park in June, 1942, offers to every Canadian doctor and his family an opportunity which, if at all possible, should not be missed.

What Will It Cost?

We are glad to announce that most attractive railway and hotel rates have been arranged. We publish hereunder a schedule of rates which

includes first class railway fare to Jasper and return, standard lower berth as indicated, and four days' room and board at Jasper Park Lodge.

Edmonton (4) ..	\$40.10	Kitchener (2) ..	\$145.45
Kamloops (5) ...	45.80	Toronto (2) ...	145.45
Calgary (3)	50.60	London (2)	145.45
Saskatoon (5) ..	57.95	Windsor (2) ...	145.45
Regina (5)	64.15	Hamilton (2) ..	145.45
New		Brantford (2) ..	145.45
Westminster (1).	63.75	Ottawa (5)	162.80
Vancouver (1) ..	63.75	Montreal (5) ..	170.45
Victoria (1)	66.70	Quebec (5)	186.00
Nanaimo (1)	66.70	Moncton (5) ...	208.90
Kelowna (5)	64.90	Fredericton (5).	208.90
Winnipeg (5) ...	84.45	Saint John (5)..	208.90
Fort William (5)	103.35	Halifax (5) ...	218.90

(NOTE: These rates are as of 1941. The rates for 1942 will not be quoted until some time later, probably in the month of May, but we are assured that these probably will be unchanged.)

Reference Numbers:

- (1) Denotes standard lower berth from Vancouver and return.
- (2) Denotes standard lower berth from Toronto and return.
- (3) Denotes standard lower berth from Calgary to Edmonton and return; also seat from Edmonton to Jasper and return.
- (4) Denotes seat Edmonton to Jasper and return.
- (5) Denotes standard lower berth from place named and return.

Tickets from Kamloops and Kelowna carry a six months' return limit, while others mentioned bear a final return limit of 21 days from date of sale.

Rates exclusive of accommodation and meals at Jasper Park Lodge are arrived at by subtracting \$24.00 from the schedule as quoted.

Special hotel rates, apart from the all-inclusive rates presented above, are as follows:

For double rooms equipped with either private tub or shower bath, and meals, \$16.00 a day or \$8.00 per person.

For double rooms without private bath or shower, and meals, \$12.00 a day or \$6.00 per person.

All the double rooms are equipped with twin beds. In order to accommodate the entire party at the Lodge, it may be necessary to ask those travelling singly to double up.

As the regular rates at Jasper Park Lodge range from \$8.00 to \$18.00 a day for single

rooms, and from \$14.00 to \$26.00 a day for two persons in double rooms, including meals, it will be noted that the rates quoted for our convention have been substantially reduced.

Hotel reservations should be made early by writing to The Manager, Jasper Park Lodge, Jasper, Alberta. Be sure to state names and addresses of members of your party, date of arrival, accommodation desired and how long you expect to stay.

Special Notes

(1) Delegates taking advantage of the Summer Tourist tickets with Vancouver or Victoria destination may be routed via Prince Rupert, either going or returning, on payment of an additional \$13.00. This amount covers meals and berth on the steamer.

(4) Golf Charges—for Canadian Medical Association registrants, per day	\$ 1.50
General Drive	3.00
Maligne Canyon	2.00
Punch Bowl Falls	4.00
Glacier of the Angels, Mount Edith Cavell	4.00
Miette Hot Springs and Fiddle River	
Canyon	5.50
Columbia Icefield, Jasper-Banff Highway.	10.00

We are informed by the Superintendent of Jasper National Park, that while it is impossible to definitely state that the Jasper-Banff Highway will be open by June 15th, the road was opened on May 23rd last year, and it could be taken to be reasonably certain that it will be open by the 1st of June this year.

Rates and time tables for Trans-Canada Air Lines are as follows:

From—	CALGARY	LETHBRIDGE	VANCOUVER	REGINA	WINNIPEG	NORTH BAY	TORONTO	LONDON	WINDSOR	OTTAWA	MONTREAL	MONCTON	HALIFAX	NEW YORK	To
One Way	10.50	17.30	45.40	39.30	59.30	115.40	122.90	128.25	134.60	127.20	133.80	159.50	166.60	142.40	Edmonton
Return..	18.90	31.15	81.70	70.75	106.75	207.75	214.55	224.20	235.60	228.95	240.85	287.10	299.90	249.65	
One Way		6.80	34.90	28.80	48.80	104.90	112.40	117.75	124.10	116.70	123.30	149.00	156.10	131.90	Calgary
Return..		12.25	62.80	51.85	87.85	188.85	195.65	205.30	216.70	210.05	221.95	268.20	281.00	230.75	

NOTE: ALL FARES QUOTED ARE SUBJECT TO 10% TRANSPORTATION TAX

Read Down				Read Up			
	4:00 p.m.	Leave	Halifax.....	Arrive	6:15 a.m.		
	5:10 "	"	Moncton.....	"	5:10 "		
8:00 a.m.	8:15 "	"	Montreal.....	"	1:35 "	11:55 a.m.	
8:50 "	9:10 "	"	Ottawa.....	"	12:45 "	11:05 "	
8:00 "	(x) 8:00 "	"	New York.....	"	1:30 "	(b) 12:35 p.m.	
....	9:00 "	"	Windsor.....	"	12:30 "	
....	9:55 "	"	London.....	"	11:30 a.m.	
10:40 "	11:05 "	"	Toronto.....	"	10:55 p.m.	9:20 "	
....	12:35 a.m.	"	North Bay.....	"	9:25 "	
4:55 p.m.	5:50 "	"	Winnipeg.....	"	2:55 "	2:00 "	
6:05 "	7:00 "	"	Regina.....	"	11:55 a.m.	10:55 p.m.	
5:00 "	6:00 "	"	Vancouver.....	"	11:35 "	10:45 "	
9:00 "	9:55 "	"	Lethbridge.....	"	9:20 "	8:20 "	
9:50 "	10:45 "	Arrive	Calgary.....	Leave	8:30 "	7:30 "	
9:55 "	10:50 "	Leave	Calgary.....	Arrive	8:25 "	7:25 "	
11:05 "	12:00 noon	Arrive	Edmonton.....	Leave	7:15 "	6:15 "	

(x) Daily except Saturday.

(b) Daily except Sunday.

All times quoted are Standard.

(2) Summer Tourist tickets from Eastern Canada with Pacific Coast destinations may be routed on the going journey via Canadian National, and on the return journey via Canadian Pacific, or vice versa.

(3) The bus fare from Jasper to Lake Louise, one way, is \$13.50, plus \$1.35 Government tax, while the through fare from Jasper to Calgary, one way, is \$17.60, plus \$1.75 Government tax.

Personnel in Charge of Annual Meeting

President

DR. GORDON S. FAHRNI, WINNIPEG

President-Elect

DR. A. E. ARCHER, LAMONT

General Secretary

DR. T. C. ROUTLEY, TORONTO

Committee on Arrangements*(Resident in Edmonton unless otherwise indicated)**General Chairman*

DR. A. E. ARCHER, LAMONT
President-Elect, Canadian Medical Association

General Secretary

DR. T. C. ROUTLEY, TORONTO

Local Chairman

DR. G. N. ELLIS
President, Edmonton Academy of Medicine

Local Vice-Chairman

DR. J. W. SCOTT
Past-President, Edmonton Academy of Medicine

Local Honorary Secretary

DR. J. ROSS VANT
President, Alberta Division, C.M.A.

Subcommittees

BADGES, SIGNS AND FLAGS—DR. E. S. ALLIN, *Chairman*.
DR. F. W. LAW, *Secretary*

CEREMONIAL PROCEDURE—DR. W. A. SCANLON, *Chairman*.

COMMERCIAL EXHIBITS—DR. A. F. ANDERSON, *Chairman*.
DR. C. S. DOBSON, *Secretary*.

ENTERTAINMENT—DR. D. B. LEITCH, *Chairman*.
DR. A. DAY, *Secretary*.

EQUIPMENT—DR. MAX CANTOR, *Chairman*.

FINANCE—DR. W. A. WILSON, *Chairman*.
DR. N. E. ALEXANDER, *Secretary*.

GOLF—DR. G. F. ELLIOTT, *Chairman*.
DR. W. HUSTLER, *Secretary*.

HOUSING—DR. G. GRAY, *Chairman*.

LIAISON WITH LADIES' COMMITTEE—DR. D. B. LEITCH,
Chairman.

PUBLICITY—DR. J. O. BAKER, *Chairman*.
DR. R. F. NICHOLLS, *Secretary*.

REGISTRATION AND INFORMATION—DR. A. MCGUGAN,
Chairman.

SCIENTIFIC EXHIBITS—DR. J. W. MACGREGOR, *Chairman*.

TRANSPORTATION—DR. J. K. FIFE, *Chairman*.

Local Program Committee

CHAIRMEN AND SECRETARIES OF SECTIONS

DR. HAROLD ORR, *General Chairman*.

ANÆSTHESIA—DR. E. H. WATTS, *Chairman*.
DR. W. S. JOHNS, CALGARY, *Secretary*.

DERMATOLOGY—DR. HAROLD ORR, *Chairman*.
DR. A. G. DUNCAN, CALGARY, *Secretary*.

HISTORY OF MEDICINE—DR. H. C. JAMIESON, *Chairman*.
DR. MAX CANTOR, *Secretary*.

MEDICINE—DR. E. L. POPE, *Chairman*.
DR. G. R. DAVISON, *Secretary*.

MILITARY MEDICINE—DR. WALTER SCOTT, *Chairman*.
MAJOR C. E. ANDERSON, *Secretary*.

OBSTETRICS AND GYNÆCOLOGY—DR. J. ROSS VANT,
Chairman.
DR. A. DAY, *Secretary*.

OPHTHALMOLOGY AND OTOLARYNGOLOGY—DR. M. R.
LEVEY, *Chairman*.
DR. E. F. FOY, *Secretary*.

PÆDIATRICS—DR. D. B. LEITCH, *Chairman*.
DR. J. CALDER, *Secretary*.

RADIOLOGY—DR. A. D. IRVINE, *Chairman*.
DR. R. W. BOYD, CALGARY, *Secretary*.

SURGERY—DR. W. F. GILLESPIE, *Chairman*.
DR. N. E. ALEXANDER, *Secretary*.

UROLOGY—DR. G. N. ELLIS, *Chairman*.
DR. F. PILCHER, CALGARY, *Secretary*.

Central Program Committee

LOCATED IN TORONTO

Drs. Duncan Graham (*Chairman*), Harvey Agnew,
Alan Brown, H. K. Detweiler, H. A. Dixon, J. H. Elliott,
Roscoe Graham, J. C. McClelland, A. E. MacDonald,
G. E. Richards, T. C. Routley, Wm. Scott, H. J. Shields,
D. E. S. Wishart, George S. Young.

Medical War Relief Fund**Additional Subscriptions**

Additional subscriptions to this Fund are:
Victoria County Medical Society, Lindsay, Ont.,
\$20.00; Northumberland and Durham Medical
Society, Campbellford, Ont., \$65.15; British
Columbia Division, \$635.18; Quebec Division,
\$60.00.

The War**The Association's Offer for War Service**

THE CANADIAN MEDICAL ADVISORY COMMITTEE

The Canadian Medical Advisory Committee meeting in Ottawa on Wednesday, January 14th, submitted a memorandum to the Honourable J. L. Ralston, Minister of National Defence for the Army, as presented hereunder.

The Minister expressed himself as pleased with the relationship which had been established between the Canadian Medical Association and the military authorities. He asked the Committee if it were in agreement with the plan in operation in Great Britain, as outlined in the Addendum to our report. The Committee felt that the British plan was operating successfully, and, under the selective service system, a similar plan might operate equally well in Canada.

The various points raised in the submission were discussed at length and the Minister agreed to consider these points with his Officers and later advise us of any further action which in his opinion should be taken.

Among other matters dealt with by the Committee were the following:

Survey of interns.—It was agreed that a questionnaire and covering letter would be sent to every intern serving in a Canadian hospital, following which a conference will be held to be attended by the members of the Committee and

the senior medical officers of the three Services, for the purpose of allocating to service interns who are available as they leave hospital during the coming months.

Orthopædic Unit for Scotland.—Under the Chairmanship of Dr. D. E. Robertson of Toronto a special committee was set up to organize, in co-operation with the Canadian Red Cross Society, an Orthopædic Unit to proceed to Scotland. Your Committee was pleased to learn that, under the command of Dr. A. B. LeMesurier of Toronto a Unit consisting of 8 doctors and 21 nurses is now in Scotland.

Other matters of more or less routine character were dealt with, relating to enlistments, promotions, examination of recruits, distribution of films, relationship between Provincial Advisory Committees and Senior Medical Officers of the Services, Wassermann tests for recruits, and matters concerning pensions.

SUBMISSION FROM

THE CANADIAN MEDICAL ASSOCIATION TO
THE HONOURABLE COLONEL J. L. RALSTON
MINISTER OF NATIONAL DEFENCE FOR THE ARMY,
JANUARY 14, 1942

On September 1, 1939, the Canadian Medical Association sent the following telegram to the Right Honourable W. L. Mackenzie King, Prime Minister of Canada, the Honourable Mr. Rogers, Minister of National Defence, and the Honourable Major Power, Minister of Pensions and National Health:

"In this time of crisis I am directed to say that the Canadian Medical Association with its Divisions and Branches across Canada stands ready to perform such services as may be regarded as properly coming within its scope. In the event of war the medical needs of the army and of the civilian population give rise to problems of medical selection in order that both needs may be met adequately. In the Motherland the British Medical Association has undertaken to act in an advisory capacity to the Government in the solution of these problems. Should the Government of Canada desire the Canadian Medical Association to act in a similar advisory capacity, may I repeat that the Canadian Medical Association is ready and willing to do so."

T. C. ROUTLEY,
General Secretary.

The Prime Minister in reply stated that the message would be brought to the attention of his colleagues in the Government.

On Tuesday, September 19, 1939, the Honourable C. G. Power, Minister of Pensions and National Health, suggested that such recommendations as the Canadian Medical Association had to make be placed on paper and tabled with the Government.

On the same date, namely, September 19, 1939, the following memorandum was presented to the Honourable the Prime Minister, the Honourable the Minister of National Defence, and the Honourable the Minister of Pensions and National Health:

"Subsequent to the sending of our telegram [that of September 1st, already quoted], an opportunity has been afforded the Association to explore carefully the present national emergency and the relation of the medical profession of Canada thereto. The Association believes that it can perform a useful and essential service in the present crisis by doing as follows:

(a) Preparing a Register of the medical profession of Canada, which Register will embody the following data concerning each member of the medical profession in Canada: (1) Age, marital status, number of dependents. (2) Medical qualifications including military experience. (3) Positions now held—university, hospital, governmental,—either whole or part time. (4) Type of military service at home or abroad, whole or part time, which each doctor is willing to perform.

(b) Setting up within its organization a national committee with district representation; this committee to co-operate with the Governmental authorities in meeting military and civilian needs in order that medical services may be used most advantageously.

On September 22, 1939, the Prime Minister acknowledged the receipt of the memorandum and stated in part that he had learned with much satisfaction of the Association's proposals to prepare a Register of the medical profession of Canada and to set up a national committee to co-operate with the Government in meeting military and civilian requirements for medical services. On September 25, 1939, the Executive Committee of the Canadian Medical Association conferred with the Honourable Norman Rogers, Minister of National Defence, at which time the proposals made by the Association were carefully examined. Briefly stated again, these proposals were: (1) To conduct a survey of the medical profession of Canada. (2) To establish medical Advisory Committees, national and provincial. (3) To perform any other services of which the Association might be capable, when and if invited to do so.

On September 27, 1939, the Adjutant General, Major General H. H. Matthews, stated, "I feel sure that continued co-operation between your Association and the military authorities, as well as the Department of Pensions and National Health, will be of the very greatest assistance."

On September 29, 1939, the Honourable Mr. Rogers, Minister of National Defence, stated, "The proposals put forward as a result of your meeting in Ottawa are acceptable to this Department and it is certainly our wish that you proceed along the lines indicated."

The Canadian Medical Association proceeded forthwith to implement its proposals. Central and Divisional Medical Advisory Committees were established within thirty days. The Central Committee, called the Canadian Medical Advisory Committee, has since that date been available for consultation with the Governmental authorities at Ottawa. The Divisional Advisory Committees corresponding to the Military Districts, have been available for consultation with the appropriate medical officers of the Departments of Navy, Army and Air Force.

A survey of the entire medical profession of Canada was immediately begun by utilizing a

questionnaire card. Within a very few weeks approximately 85 per cent of the ten thousand doctors in Canada had been heard from. All the information received was coded and transferred to a punch card system (Hollerith). By the use of the punch card in an electrically operated sorting machine, any or all of the information secured from the profession can be made available in a few hours' time; and, on a number of occasions this information has been used by the military authorities. A summary of the returns was made available on a national register, with additional copies being supplied to the Divisional Advisory Committees.

Since the time of the original survey, additional questionnaires have been received from more recent graduates and from doctors who had not previously replied, indicating that more than 90 per cent of the doctors of Canada co-operated most helpfully in the survey. Mention should be made of the fact that the questionnaire was submitted in the French language to our French-Canadian medical colleagues, and the number of replies received from these gentlemen compared favourably with those received from English-speaking members of the profession.

As the war progressed and with the passing of time, it became evident that circumstances had intervened to alter the commitments expressed by many members of the profession in their replies. In the opinion of the Canadian Medical Advisory Committee the results of the questionnaire must now be regarded as not being strictly up to date. Accordingly, consideration might properly be given to the advisability of a new survey being made.

With respect to the future demands which will be made upon the medical profession of Canada in connection with the war, the following points deserve consideration:

There are roughly ten thousand doctors in Canada, to serve approximately twelve million people.

The nine medical schools of Canada graduate approximately 500 students each year. Allowing for American graduates of our Schools, physical disabilities, and necessary civilian replacements, it is unlikely that more than 300 graduates per year will be available for war service. All such graduates should have at least an eight-month internship before enlisting for military service. On behalf of the three fighting services our Committees are now making a survey of interns presently engaged in Canadian hospitals.

At the present time, close upon 2,000 Canadian doctors are in military service. In recent months, it has become increasingly clear that medical personnel offering to enlist for military service has become less plentiful than in the early days of the war. In addition to the medical requirements of the military services, medical personnel is required for Medical Boards across Canada, which have been set up under the De-

partment of National War Services. Civilian medical needs (including the organization of the A.R.P.) require even more careful consideration than heretofore appeared necessary.

There are some areas of Canada, particularly the larger centres, which undoubtedly could spare a considerable number of their medical practitioners without endangering medical service to the civilian population. On the other hand, there is already evidence before us that, in rural municipalities some communities have been stripped of their medical personnel and this situation is more likely to become worse than better. How are the available doctors necessary for military service to be secured? How is the civilian population to be protected? A policy of careful selection and placement, as is in effect in the British Isles would appear to hold the answer.

Attached hereto is a summary of the British Plan. It has been in operation since the war began and, according to our information, has given satisfaction to all concerned. With more than two years' experience behind us, the following observations and recommendations are submitted:

1. On the outbreak of war, the Canadian Medical Association as a voluntary agency, undertook with Government approval, to do two things: (a) to make an inventory of the medical profession of Canada; and (b) to set up Advisory Committees. Both have been done at the expense of the Association.

2. The medical authorities of the military services state that the information available from the Canadian Medical Association has been of some use.

3. Most friendly relationships have been established between the medical personnel of the fighting services and the Canadian Medical Association.

4. Medical enlistments have been carried out by the three fighting services largely independently of each other.

5. The Canadian Medical Association, being a voluntary advisory body, has been limited in its usefulness to the giving of information and advice when asked for it.

6. There is no co-ordinating agency acting with or for the fighting services charged with the responsibility of securing and placing medical personnel.

7. There is no agency or board or committee charged with the responsibility of maintaining a proper balance between military and civilian medical requirements.

8. There is no machinery functioning in Canada, at the present time, by which all medical man-power in the country can be directed to the end of its greatest usefulness.

9. With every indication of this being a long war, requiring more man-power, which means more medical personnel, it would seem desirable that a policy and plan should be put into

operation which would ensure that the fighting services would secure all the doctors they require, at the same time attempting to preserve for the civilian population, with its ever-increasing war demands, sufficient medical personnel, properly distributed.

10. The plan in operation in England, devised and operated by the British Medical Association (with co-opted committee members) appears to have given satisfaction.

PLAN ADOPTED AND IN OPERATION IN GREAT BRITAIN AND NORTHERN IRELAND FOR THE ORGANIZATION OF THE MEDICAL PROFESSION IN TIME OF WAR

SUMMARY

The principal points which the Central Emergency Committee of the British Medical Association would emphasize in the preparation of a medical war organization, excluding the provision of air raid precautions, may be summarized as follows.

1. A central emergency committee should be created and it should have official status, even though its work may be conducted through the machinery of a voluntary organization. It should be fully representative of all branches of medical practice and of the Government Departments concerned. A voluntary organization whose machinery is utilized should scrupulously avoid any appearance of discrimination between its members and non-members.

2. In conveniently small areas local emergency committees should be established to serve as a link between the central committee and individual practitioners. The local committees should be representative of all medical interests in the area.

3. A national war register of the profession should be compiled.

4. All requests for medical personnel from the Services and other Government Departments should be made only through the central committee which should advise on allocation in consultation with the local committees.

5. A scheme for the protection of practices of absentee practitioners should be prepared.

6. An emergency medical bureau should be created to control the provision of medical services for the ordinary civilian sick.

War Literature

THE CANADIAN MEDICAL ASSOCIATION JOURNAL
Nominal Roll of Medical Officers (R.C.A.M.C., appointed to the Active Force, Army), 1942, 46: (Supplement).
Crush Syndrome, H. R. Robertson and W. H. Mathews, 1942, 46: 116.

THE LANCET

Concentrated Serum in Head Injuries, J. W. A. Turner, 1941, 241: 557.
Black Currant Purée as a Source of Vitamin C, W. W. Payne and E. Topley, 1941, 241: 596.

Industry's Claim on Medicine (leading article), 1941, 241: 671.

Industry's Claim on Medicine (leading article), 1941, 241: 471.

Typhus Immunization (leading article), 1941, 241: 671.

BOOKS AND PAMPHLETS

Warwick and Tunstall's First Aid to the Injured and Sick (N. Hammer, Editor), John Wingert & Sons, Bristol, 1941, price 3/6.

Lectures on War Neuroses, T. A. Ross, Macmillan, Toronto, 1941, price \$1.75.

Surgery of Modern Warfare, H. Bailey, Part V, Macmillan, Toronto, price \$5.25.

Medical Diseases of War, Sir Arthur Hurst, Macmillan, Toronto, 1941, price \$5.50.

Evacuated Children (Edited by Susan Isaacs), Methuen & Co., London, 1941, price 8/6 net.

Bulletin of War Medicine, 1941, 2: many pp. Contains numerous valuable abstracts on war medicine and surgery, H. M. Stationery Office, London, price 2/6.

Medical Foundations

The Banting Research Foundation

The Banting Research Foundation reports that grants made to individuals working on medical problems in different parts of Canada last year were instrumental in furthering research of considerable interest in several fields. Following are brief summaries of work performed by those holding grants during part or whole of last year.

To test the accepted hypothesis that oxidation of α -estradiol to estriol, or hydration of estrone to estriol, takes place in the uterus under the influence of progesterone, Mr. W. S. Bauld, Dalhousie University, working with Dr. R. D. H. Heard, showed that in the rabbit this transformation occurred.

W. H. Feindel and Dr. C. B. Weld, at Dalhousie University, studied the permeability of the eye membranes in dogs to the sugars xylose, glucose, sucrose and raffinose. It was found that their penetration into the aqueous humour was inversely related to their molecular size, and that raffinose represents the approximate limit of the size of the molecule which passes through the membranes.

Dr. K. C. Fisher, University of Toronto, extended his investigation of the mechanism of the action of anaesthetics to include a broad variety of narcotic agents and cells. The initial interpretation, namely that the metabolism of a cell is separable into two independent parallel fractions, has been fully borne out.

A. G. Gornall, University of Toronto, found that in urea-synthesis studies, the accumulation of citrulline occurred in liver slice saline containing NH_3CO_2 , lactate and ornithine. This

research forms an important step in our knowledge of the means by which urea is formed in the body.

Dr. Mavis Gunther, University of Toronto, has made a survey of the progress of lactation in a series of women. She has accumulated statistics of when and why infants are weaned and has analyzed the causes of women being unable to nurse satisfactorily.

Mr. M. M. Hoffman, Dalhousie University, working with Dr. R. D. H. Heard, has furnished experimental confirmation of the hypothesis that the urinary oestrogen, oestrone, arises in the body from the ovarian follicular hormone, α -oestradiol. The metabolism of the corpus luteum hormone was also investigated and it was found that in the rabbit, as in the human, pregnane-3 (α), 20 (α)-diol is the main excretory product and the conversion in the rabbit is not appreciably affected when the uterus is removed.

Mr. A. F. McKay, Dalhousie University, working with Dr. R. D. H. Heard, continued investigations dealing with the degradation of cholesterol to Ring B substituted androgens, with the object of elucidating the structure of certain isomers of androsterone excreted during pregnancy in the mare.

Miss M. M. MacKenzie, University of Western Ontario, studied the relation of age of rats to susceptibility to cancer induced by benzanthracene. She found younger rats more susceptible than older ones but the strain of the rat was found to be much more important than its age or sex.

Miss D. B. Mundell, University of Toronto, has devised a simple method for the purification of tissue cholinesterase from dog pancreas. One milligram of the purified esterase hydrolyses 4 to 5 grams of acetylcholine per hour. This degree of purity is about 100 times greater than that obtained by Stedman.

Dr. L. T. Newman and Messrs. W. A. Ladd and J. H. L. Watson, University of Toronto, worked on several applications of the electron microscope to medical research. With Dr. D. Irwin, a study was made of the size of the particles of mine dust and it was found that particles 0.03 to 0.20 microns in diameter were much more numerous in drilling than in blasting dust. With Dr. J. Craigie, School of Hygiene, University of Toronto, several hundred photomicrographs of vaccinia virus, typhoid bacillus, rickettsia and bacteriophage were taken.

Miss H. M. Perry, University of Toronto, performed experiments which showed that the lessened carbohydrate stored in scorbutic conditions was due to inanition and not to the deficiency of vitamin C. A peculiar condition of fat storage in vitamin C deficiency was substantiated, but fatty or cirrhotic livers were not observed. Experiments also showed that the capillary fragility is not a good index for the clinical estimation of either vitamin C or P deficiency.

Mr. H. C. Read, Dalhousie University, found that the X-zone of the adrenal glands of the mouse degenerate during pregnancy and will regenerate after pregnancy, but that regeneration is delayed by lactation. In immature animals the X-zone can be made to disappear by injections of oestrone, testosterone, A.P.L. and P.M.S. hormones.

Dr. K. Sternbach, University of Toronto, tested the activity of 104 new compounds of the sulfanilamide type, prepared by Dr. Schnitzer, against meningococcus infection. Ten showed definite activity but no more than that of drugs already known. Of a smaller series of drugs prepared by Dr. Siebenmann, two were found which were as efficacious as sulfanilamide with regard to meningococcus infection and were decidedly less toxic. Dr. Sternbach has also obtained a method of infecting animals with gonococci so that sulfanilamide compounds could be tested against this type of infection in animals.

Dr. P. G. Weil, Royal Victoria Hospital, Montreal, has made further studies with regard to the histamine content of blood and tissues in shock. He has also investigated the value of certain substitutes for whole fresh blood in the treatment of the condition.

The Trustees wish to point out that in addition to financially assisting the above-described individual researches, the Foundation gave a block grant, amounting to almost half the income to the Banting and Best Chair of Medical Research, University of Toronto.

The Trustees wish to remind medical research workers in Canada that funds are available each year to financially assist individuals who submit problems which meet with the approval of the Trustees. Meetings at which applications are considered are usually held in May, August and December.

V. E. HENDERSON,
A. W. HAM.

University Notes

Microscopes Needed for Medical Students at the University of Toronto

Owing to the war situation, microscopes will not be procurable by medical students for their training in histology, bacteriology, pathology and clinical laboratory methods.

Should any doctors be willing to sell their microscopes to medical students needing them, they are requested to notify the Assistant Dean and Secretary of the Faculty of Medicine, stating the manufacturer, the accessories (especially sub-stage condenser and oil immersion lens) and the price asked.

Medical Societies

La société médicale des hôpitaux universitaires de Québec

Une séance de cette Société eut lieu à l'Hôpital du St-Sacrement le 5 décembre 1941. Suivent les résumés des présentations:

SYPHILIS ET ESTOMAC.—R. Lemieux et H. Naeaud.

Les auteurs présentent les observations de quatre malades atteints de syphilis et souffrant de troubles gastriques d'origine lésionnelle et fonctionnelle.

Dans les deux premiers cas, les lésions gastriques sont nettement visibles à l'examen radiologique: lésions gommeuses et lésions de gastrite aiguë. Les réactions sérologiques pour la syphilis sont franchement positives, il s'agit d'une syphilis ancienne. Le traitement habituel de l'ulcère et de la gastrite aiguë ne donne aucun résultat. Par contre, le traitement anti-syphilitique à l'arsenic et au bismuth amène une transformation rapide et radicale de l'état gastrique, avec disparition totale de l'image radiologique anormale dans un cas, et fortes modifications dans l'autre cas.

Dans les deux derniers cas, il s'agit de troubles gastriques fonctionnels sans image anormale de l'estomac aux rayons X. La chlorrhémie gastrique est très basse dans un cas, elle est supérieure à la normale dans l'autre cas. Les réactions sérologiques sont nettement positives pour la syphilis. Le traitement anti-syphilitique fait disparaître rapidement les troubles fonctionnels: douleurs, gonflements épigastriques post-prandiaux, nausées, vomissements alimentaires, anorexie, etc; le traitement simple de la gastrique chronique étant resté totalement inefficace.

L'atteinte syphilitique des sujets, confirmée par les réactions sérologiques positives, la constatation d'une amélioration rapide et radicale à la suite de l'institution du traitement anti-syphilitique, semblent confirmer le diagnostic de syphilis gastrique.

TUBERCULOSE RÉNALE EXCLUSE.—J. N. Lavergne.

La tuberculose rénale excluse est toujours précédée d'une période de tuberculose rénale ouverte et représente, de la part de l'organisme, une tentative de guérison par néphrectomie spontanée. Cette néphrectomie spontanée se fait en deux temps: un premier temps qui comprend l'oblitération de l'uretère; un second temps qui comporte les modifications du contenu rénal, et donne naissance aux formes anatomo-pathologiques suivantes: 1°—forme pyonéphrotique; 2°—forme uro-néphrotique; 3°—rein mastic; 4°—rein atrophique.

L'exclusion amène une amélioration, parfois même la guérison des lésions tuberculeuses vésicales. Le diagnostic s'établit par l'histoire de la cystite, le cathétérisme urétéral, la cystoscopie, la recherche des B.K. la radiographie simple et l'urographie intraveineuse. La thérapeutique ne peut être que chirurgicale; comme il est prouvé que le processus tuberculeux n'est jamais complètement éteint dans le rein exclus, la néphrectomie devra toujours être pratiquée quand l'état général le permet.

Trois observations de tuberculose rénale excluse, forme rein mastic calcifié, sont rapportées, avec radiographies mettant en évidence les zones de calcification rénale.

COMPLICATIONS PULMONAIRES POST-OPÉRATOIRES.—F. Trempe et J. M. Lemieux.

On estime en temps ordinaire la fréquence des complications pulmonaires de 2 à 4 pour cent. Les causes sont complexes. Il existe d'abord des causes prédisposantes: la débilité respiratoire antérieure, le tabagisme, l'âge avancé du malade, le refroidissement durant le trajet à travers les corridors, etc.

Les causes qui relèvent directement de l'acte opératoire sont: l'infection descendante par inhalation de substances anesthésiques, les infections métastatiques venant du foyer opératoire, les infarctus, les réactions pulmonaires anaphylactiques causées par la polypeptidémie, l'atélectasie. Mais la grande cause c'est la perturbation de la mécanique respiratoire qui existe après l'opération. On peut démontrer cette façon de voir par les statistiques, par la clinique et la thérapeutique. Enfin durant les saisons froides, il existe un élément endémique et une contagion d'un malade à l'autre. Au point de vue clinique on peut difficilement faire entrer les complications pulmonaires post-opératoires dans les cadres admis en pathologie interne.

Quant au traitement, il doit surtout tendre vers la prophylaxie et voici un résumé des différents moyens que l'on peut mettre en œuvre: 1°—Isolement strict du malade avant l'intervention et le laisser lever jusqu'à l'opération si possible. 2°—Désinfection nasale et pharyngée et nettoyage des dents, choix judicieux de l'anesthésie. 3°—Prophylaxie bactériologique par les prélèvements pharyngés et la vaccination. 4°—Prophylaxie médicamenteuse avec la créosote ou les sulfamidés. 5°—Après l'opération lutter contre la douleur qui contribue à restreindre les mouvements respiratoires. 6°—Faire des pansements plutôt lâches, utiliser la mobilisation et le lever précoce. 7°—Inhalation de CO₂ durant les deux ou trois premiers jours. 8°—Aspirations des sécrétions bronchiques dans les cas d'atélectasie.

Letters, Notes and Queries

The Need for Medical Officers

To the Editor:

In the issue of your *Journal*, volume 46, January, 1942, page 69, there is an Editorial headed "The Need for Medical Officers by the Defence Services", with a statement by Brigadier R. M. Gorssline, Director General of Medical Services and an editorial comment.

It is difficult for me to understand how Brigadier Gorssline can publish such an article, nor can I understand the inertia exhibited by the Canadian Medical Association over this question. At the start of the war cards were sent out by the C.M.A. in order to get registrations. I with the majority of medical men filled out these cards, and God only knows how many cards and forms I have filled out since. What has become of them? Of what use have they been? Certainly one never receives an acknowledgment from any source.

Have the C.M.A. and Brigadier Gorssline still decided to flounder in the age limit zone of red tape? Will they ever wake up to the realization of physical fitness, and ability to do their work, against an arbitrary age limit? Up to the present it does not look like it.

A report published from a speech by Colonel Ralston in the House of Commons on March 3, 1941, says, "Of approximately 20,000 men discharged from the armed services since the beginning of the war, about 10,000 were found to be physically unfit." Also "The fact is our

Answers to letters appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

Medical Boards at the start did not categorize with the efficiency we looked for." It seems to me that these statements should have been challenged by the C.M.A. and a definite cause located. If those were the figures at the above date one can only surmise what they are now, but in all local areas one can see the same thing going on with its accompanying loss of time and money to the country.

In connection with the above paragraph I think the answer is obvious. Young men were taken into the service who had no medical training, so far as military necessities were concerned. They could not appreciate that a man might be fit for his usual vocation but was totally unfit for military duty. They were not even given military training after being taken in the service and really did not know what it was all about. This, mark you, with sufficient medical men on the Reserve and Retired Lists to at least act in an advisory capacity to the medical boards, but still Age! Age! Age! What rot! Men of all ages can sit in Parliament, direct the destinies of our country, and play with our people, but forsooth a medical man is too old for work as a medical man.

My own case is so childish and disgusting that I will not inflict it on your readers. I offered my services through *the proper military channels* in September, 1939. I was placed on the active list physically fit. I am in better physical condition now than at that time. My uniform cost me \$175.00. It is feeding the moths. I am buried in the red tape of the C.M.A. or Brigadier Gorssline's service, I do not know, I have never been given the courtesy of a statement. Thank you.

W. H. EAGAR, M.D.

Wolfville, N.S.
February, 5, 1942.

Recruiting in the Medical Profession

To the Editor:

There are a large number of veterans among the doctors in Canada who are, I think, very much dissatisfied with the way recruiting in the medical profession is being handled. This criticism relates to methods of publicity or appeal or whatever term you may wish to use. Dr. Routley told the Hamilton Academy of Medicine about the effort of the Association the other night. He described in detail a wonderful card indexing machine which is in use at headquarters. Whether it has been of enough practical use to justify its purchase seemed to me to be problematical. Dr. Routley gave a list of the doctors on the committee from the Canadian Medical Association who confer with the Minister of Defence and the Director General of Medical Services.

I am not paying \$15.00 a year to read the *Canadian Medical Journal*, but I am paying it expecting that a proper selection of doctors will

be made when committees are being appointed to interview the Government.

In the last war the fighting services, and these should have included the medical corps, were never satisfactorily handled when permanent corps officers had charge. Could one suggest that this could be the reason now? I do not think so knowing what I do of Brigadier Gorssline and his excellent record. In the first place his rank puts him in an inferior position to other army men with much less ability and responsibility. His hands are tied by politicians who are more interested in getting good medical jobs for their friends than seeing that the Director-General is given a free hand.

This letter may seem a little radical but I, like many others, think a great crisis is coming and good men of great experience should be at the head of things and representing the medical profession of Canada. I certainly think veterans of 1914-18 should be on any committee that has anything to do with the war.

F. B. BOWMAN.

Hamilton,
February 6, 1942.

Special Correspondence

The London Letter

(From our correspondent)

Medicine and industry.—The industrial front is in modern war just as important as the actual fighting area. Figures are naturally not available of the medical personnel of the fighting services but it is safe to assume that they are greatly superior to the "over 150 whole-time and probably over 500 part-time medical officers employed by industry" in Great Britain at the present time. Yet even these figures represent a big advance from 20 whole-time medical officers in 1927 and 60 in 1939.

The great industrial effort called for has been termed a challenge to the medical profession, for the Government has made it clear by an official order that in every factory, large or small, there can be, and all enlightened scientific opinion says that there should be, medical supervision. A recent and valuable report by a special committee set up by the British Medical Association makes it clear that an adequate medical service for industry does not necessarily mean an elaborate and expensive organization. A medical practitioner's duties in industry are summed up by this report as including: medical supervision of employees during working hours, supervision of general working conditions, organization and supervision of accident service, including rehabilitation, study of specific occupational hazards and preventive measures for their control and air-raid precaution services. The medical examination of all entrants to secure

their proper placing is recommended as an important development for the future.

The immediate problem is to train the medical personnel required and so far this has unfortunately been sporadic and limited to brief week-end courses. Further, accurate information on the causation of absenteeism from sickness is urgently necessary to serve as a basis for attacking this serious problem which before the war lost to industry 31½ million weeks' work a year. Industry is becoming more and more alive to the need for medical help. At the Austin Motor Company's works the other day a new medical department, dedicated to the late Lord Austin, was opened. This is a two-storey building with treatment rooms, (including special rooms for serious burns and resuscitation), an x-ray department, laboratories, rest rooms and examination cubicles.

The largest employer of labour in this country is the Post Office and it has always had a well organized medical branch. An important contribution to the problem of the loss of working time has recently been published by one of the medical officers of the Post Office, in which he shows that the policy of allowing healthy contacts of infectious diseases to remain at work has been abundantly justified. Not only has the number of such contacts who developed the disease been small (1 in 431 for scarlet fever) but there was no recorded case of a healthy contact transmitting any of the infectious diseases scheduled by the Post Office authorities. Now there are still many industrial concerns, units of the fighting forces and other organizations who insist upon the quarantine of healthy contacts. The Post Office experts claim that by abolition of the usual 7 day quarantine for scarlet fever contacts they saved 35 man-years per annum. A saving of this nature for every quarter of a million industrial workers and extended to cover other infectious disease contacts would be a fine contribution to the national effort which an intelligent industrial medical service could provide.

Hospitals in post-war world.—Last year an international gathering met in London to consider the position of hospitals after the war. The most interesting suggestions for collaboration were put forward, such as facilities for a greater interchange of personnel, medical and lay, between hospitals of all the nations. Speakers dealing with voluntary hospitals—a problem more especially of the English-speaking parts of the world—were keen that this essentially democratic system should be preserved in some form or other, and the chairman of the United Kingdom Council pleaded for a detailed survey of needs and costs.

For London such a survey is, in fact, in progress. The Minister of Health has appointed two expert medical men of wide experience to "survey the hospitals . . . in London and the surrounding area" . . . and "to advise the

Minister what area would appropriately be served by a hospital system centred in London and what modifications or extensions of the existing hospital facilities would be necessary or desirable to give effect to that policy". The policy referred to is that laid down in general terms by the Minister last year and referred to before in these notes. The two "surveyors" have no easy task. For even if the rest of the country can be "regionalized" and better co-operation secured, London presents peculiar problems, not least of which is that the hospitals there serve a tremendous area. Any scheme has to make allowance for the fact that at any one out-patient clinic there may be patients from Wales, the Isle of Wight, the Midlands, extremes of Kent and Sussex, in other words London will inevitably poach over at least half-a-dozen other regions every day of the week.

Certificates.—Even before the war practitioners in this country were beginning to complain of the number of certificates they had to sign in their work but things are worse now. Not only is there an increasing irritability but inevitably there is a growing laxity, for familiarity breeds contempt. When a medical man is asked to sign a certificate so that a child with a congenital dislocation of the hip can have a rocking horse he is unlikely to view other special war time demands with the seriousness they deserve.

At the recent session of the General Medical Council there were three penal cases concerning irregular certification and at the Liverpool Assizes a practitioner was sentenced to four years penal servitude for issuing a number of deliberately untrue certificates to members of H. M. Forces. There was also a recent case before the General Medical Council concerning the notification of puerperal pyrexia which involved some curious business over temperature charts. It is clear that the medical profession has a great responsibility as regards certificates and that however trivial and vexatious they must be signed with the greatest care and good faith. But something must be done to curtail the authorities who continue to assume that over-worked practitioners can be expected to take on much more office work.

Research unlimited.—An advertisement in the press was the first indication of the foundation of the "Therapeutic Research Corporation of Great Britain Ltd.", a body founded by five of the leading medical manufacturing firms in this country for the more effective prosecution of research in their industry. Planned research and the marketing of products under a common name (which means, it is hoped, some simplification of nomenclature) are two of the main objects of the new body which should certainly do much to secure that the best scientific brains of the country are available for therapeutic problems.

ALAN MONCRIEFF

London, January, 1942.

Medical Economics

Socialization of the Medical Profession in New Zealand

(From the correspondent of the *British Medical Journal* in Wellington)

The Social Security Act of 1938 made provision for taxation of one shilling in the pound on all wages and salaries for the purposes of "social security". This tax covered the cost of free treatment in public hospitals, maternity services, old age, invalidity, and unemployment pensions, free medicine from pharmacists, but not until now medical service in the homes of the people or at doctors' consulting rooms.

Recently the Social Security Amendment Bill of 1941 was introduced, when the war situation was critical and when between one-quarter and one-third of the medical profession were serving in the Army over-seas or in camps in New Zealand. This amending Bill of 1941 contained briefly the following provisions: For the purposes of the Act the expression "general medical services" meant all proper and necessary services of medical practitioners for persons entitled to any of the benefits provided, except "medical services involving the application of special skill and experience of a degree or kind that general medical practitioners as a class could not reasonably be expected to possess."

The services excluded were the administration of anaesthetics, maternity services, and such other services as might be excluded by the Minister of Health by regulations. The fees were to be 5s. (equal to 4s. sterling) for a consultation at the surgery and 6s. 6d. for a visit, these payments to be made directly out of the Social Security Fund under Government control. Payment for mileage was to be at the rate of 1s. 3d. for every mile up to twenty miles; for distances of more than twenty miles the doctor might recover mileage fees from the patient. The medical officer of health was to decide in all cases if the attendance was necessary, and he was given power to disallow the claim wholly or partly. All claims for medical fees had to be sent to the M.O.H., and had to be accompanied by a certificate from the patient or some responsible person that the service had been performed. The amount paid out of the Social Security Fund as specified above had to be accepted by the doctor in full satisfaction of all claims. Under the Bill the Minister of Health was to decide which practitioners were to be classed as "specialists". Finally, except with the consent of the Minister no doctor could sue for fees. If the patient did not give the necessary certificate the Minister, if he thought fit, might authorize the doctor to sue for fees, but only at the rate of 5s., 6s. 6d., and for mileage. If any person, including the doctor, made a misleading statement he was

liable to a fine of £100 or to imprisonment for twelve months.

Before this Bill was tabled a voluntary capitation scheme was introduced offering a capitation fee of 15s., but very few doctors accepted it; one of the few is reported to have put 6,000 patients on his list.

SUCCESSFUL OPPOSITION

It is obvious that this Bill sought to abolish private practice and put the whole profession, except "specialists" in the meantime, under the control of the Minister of Health and his officers. The doctors would be on duty for twenty-four hours a day without holidays, and the most capable and experienced would receive the same payment as juniors and with never a hope of bettering their position. The British Medical Association protested against this coercive Bill, and public indignation meetings were held. The politicians throughout the controversy affected to believe that their scheme was akin to the British panel system. The New Zealand Branch of the B.M.A. put forward a scheme much more liberal than the British one, with a high wage limit, and covering specialist services and preventive medicine.

Confronted by determined opposition the New Zealand Government changed front and brought forward new amendments which got rid of the most objectionable provisions of the Bill, but not quite all. These new amendments were passed by Parliament and are now law. They give doctors freedom to practise in the old way, but the fees are 7s. 6d. for a consultation at the surgery, 7s. 6d. for a visit, and 12s. 6d. for a visit at night or on Sundays. The doctor charges the patient on the basis of these fees, and the patient gets a receipt and recovers the amount paid from the Social Security Department or from a post office. There is nothing to prevent the doctor from charging more than these fees from patients who are able and willing to pay.

The two remaining objections to the modified Act are: (1) The fixing of doctors' fees by Parliament; to fix fees by Act of Parliament is unprecedented, and contrary to all trade union principles. The doctors have asked for a tribunal, which has not been granted. (2) One section of the community—namely, the medical profession—is debarred from access to the courts in respect of claims against patients for payments higher than those mentioned in the Act. This is also unprecedented and probably unconstitutional; at any rate, it will be generally conceded that it outrages the principles of British justice and strikes a blow at freedom.

The profession will probably not oppose the scheme and will find no fault with patients under allegedly "free" medical service obtaining a refund of 7s. 6d. a consultation from the Social Security Fund created from a 1s. in the £ tax. Under the amended law doctors of the Dominion will have no direct contact with the State, but they bitterly resent their fees being fixed by

Parliament. Most of all they resent being denied access to the courts, especially when patients may still bring actions against doctors for alleged negligence. Therefore the medical profession cannot cordially co-operate.—*Brit. M. J.*, November 22, 1941.

Abstracts from Current Literature

Medicine

Obesity. Bauer, J.: *Arch. Int. Med.*, 1941, 67: 968.

Endogenous and exogenous obesity have been described, the first meaning too much stimulation of endocrine glands concerned with lowering of metabolism; the second, imbalance between food and exercise. The author feels that this rather neat way of stating the case leaves out too many factors that play their part in metabolism. He feels that Mother Nature usually does a fair job in keeping people at a weight suited to them and that many theories of the causes of obesity confuse cause and effect. Increased appetite for instance in cases where acromegaly is produced by injections of pituitary extract, is due more to the demands of the increased size rather than to the injections. Again, subnormal basal metabolic rates are not a frequent finding in fat people.

Water and salt metabolism is found abnormal in many cases of extreme obesity. Sodium chloride is apparently retained abnormally in the tissues, capillary blood showing more than venous. There is reason to believe in the theory of lipophilia, the special tendency of one section of skin to deposit fat, such as, the abdomen as compared with the hands. Again, some people store carbohydrates in the adipose tissue rather than glycogen in the liver and muscles. "Mobilization" of fat from fat deposits is resisted in obese people. The tendency of these people to retain water and salt seems to be proved, also that lipophilia is often hereditary.

The testicular hormone inhibits the accumulation of fats in those parts where women normally accumulate fat. The ovary apparently has little to do with this metabolism. Insulin and adrenal cortex encourage lipophilia and brain tumours which affect the floor of the third ventricle.

Treatment.—(1) Dietetic: this is absolutely necessary as a foundation of other measures. Proteins should be increased at the expense of carbohydrates and fats. (2) Restrict intake of salt and fluids. (3) Thyroid extract can be used without regard to the basal metabolic rate. Large doses are given for four to six days, then a rest of several days followed by a second course of thyroid. The injecting of three to eight c.c. of boiled milk weekly seems to assist this procedure. (4) Diuresis can be produced by large

doses of a mercury preparation (salyrgan) once a week preceded by three days of administration of ammonium chloride (4 to 6 grams). This result can be imitated by taking a large quantity of water.

P. M. MACDONNELL

The Nature of the Arterial Hypertension Produced in Normal Subjects by the Administration of Angiotonin. Wilkins, R. W. and Duncan, C. N.: *J. Clin. Invest.*, 1941, 20: 721.

Angiotonin administered intravenously to normal subjects produced arterial hypertension which could be controlled by regulating the rate of administration. This arterial hypertension was accompanied by an increase of venous pressure, and frequently by other signs of myocardial failure such as, decrease in vital capacity, increase in circulation time, decrease in cardiac output, and increase in cardiac size. There was bradycardia, the spinal fluid was not significantly altered, the electrocardiogram revealed no important changes, the temperature of the skin usually decreased, but remained responsive to alterations of body temperature.

Mild symptoms of dizziness, substernal oppression, headache, nausea or palpitation may be noted. The effects subside 4 to 10 minutes after cessation of administration of angiotonin.

S. R. TOWNSEND

Effective Renal Blood Flow in Subjects with Essential Hypertension. Goldring, W., Chasis, H., Ranges, H. A. and Smith, H. W.: *J. Clin. Invest.*, 1941, 20: 637.

The filtration rate (C_{IN}), diodrast clearance (C_D) and the maximal rate of tubular excretion of diodrast (T_{MD}) were examined in 60 subjects with essential hypertension.

The functional picture presented by the hypertensive kidney is consonant with the theory that there is present in the blood in hypertensive disease one or more pressor substances which produce a reversible renal ischaemia by constriction of the efferent glomerular arterioles. In addition, there is profound impairment and ultimate destruction of tubular function. Which occurs first is unknown.

There was no evidence to warrant the conclusion that renal ischaemia is the primary cause of essential hypertension. The renal ischaemia which has its origin in increased tone of the efferent glomerular arterioles, appears to be one of the sequelae of the hypertensive process.

The authors believe that primary renal ischaemia in man, can, under proper quantitative circumstances, initiate a hypertensive process, but whether or not the secondary ischaemia associated with efferent hypertonus which is present in hypertensive subjects generally, contributes to the progress of the disease cannot be answered from this study. Alternatively, the possibility cannot be excluded that the ap-

pearance of pressor and cytotoxic substances in the blood follows a metabolic disorder in the kidney or in other organs, and is wholly independent of renal ischæmia. S. R. TOWNSEND

The Hæmodynamic Effects of Angiotonin in Normal Man. Bradley, S. E. and Parker, B.: *J. Clin. Invest.*, 1941, 20: 715.

Cardiac output, mean arterial pressure, peripheral resistance and efficient elasticity modulus were determined following intravenous administration of angiotonin. In all the experiments mean arterial pressure and peripheral resistance rose sharply. The pulse pressure tended to widen. With one exception the efficient elasticity modulus rose sharply. Cardiac output fell as a result of a marked bradycardia. There was little change in stroke volume, and while a change occurred, it was in the direction of decrease. Response to small single injections and to continuous intravenous infusions differed only in the absence of bradycardia in the latter. Kymo-roentgenogram and cardioaerogram studies revealed little change in heart size.

It was concluded that angiotonin acts directly upon the musculature of the cardiovascular system, producing arteriolar vasoconstriction and possibly increased cardiac tone.

Whether the distensibility of the central reservoir is specifically decreased by angiotonin, or whether the observed change is attributable simply to increased distension of the central arteries, cannot be stated with certainty from the data presented. S. R. TOWNSEND

Surgery

Cerebral Arteriovenous Aneurysms. Ray, B. S.: *Surg., Gyn. & Obst.*, 1941, 73: 615.

Abnormal communications between the pial and cerebral arteries and veins are probably always congenital. These lesions present an unmistakable appearance when exposed at the operating table. One sees large, pulsating and tortuous veins, some a centimeter or more in diameter, lying on the surface of the brain, and swirls of dull red blood showing through their thin walls with each pulsation. Small connecting vessels present a tangled mass of closely packed, pulsating arterioles and venules. The arteries that supply the fistula are themselves enlarged, sometimes to two or three times the normal size. A well developed collateral circulation may be indicated by enlarged, tortuous and pulsating arteries of the scalp, as well as enlarged middle meningeal arteries. Clinical evidence of these lesions may not appear until late childhood or even adult life. A bruit heard on auscultation over some part of the head is a characteristic sign. If this is present in conjunction with a history of focal convulsions or signs of unilateral motor and sensory disturbances, the diagnosis is almost certain. Roentgenograms of the skull may show slight signs of increased intratracheal pressure, in-

creased vascularity of the skull, local atrophy of the skull, or calcification in the lesion. Encephalography will demonstrate distortion of ventricles and subarachnoid spaces, and cerebral angiography will indicate the extent and location of the lesion. Direct operative attack upon the lesions is usually dangerous. Exploratory osteoplastic operation and decompression, successive ligation of the carotid arteries in the neck and roentgenography may be used with benefit either alone or in combination. The author presents a detailed analysis of six cases. FRANK TURNBULL

Le traitement chirurgical de la cholécystite aiguë chez les patients âgés de 50 ans et plus.

Glenn, F.: *Surg., Gyn. & Obst.*, 1941, 73: 649.

La cholécystite aiguë se produit assez fréquemment chez les personnes ayant dépassé la cinquantaine pour attirer l'attention du médecin et du chirurgien. Elle doit être considérée généralement comme la complication d'une maladie longtemps latente. L'indice des désordres organiques et en particulier ceux du système vasculaire est plus élevé chez les malades atteints d'une affection de la vésicule biliaire que chez qui n'en ont pas.

En cas d'urgence et d'extrême débilité du patient, l'auteur recommande de pratiquer une cholécystostomie, quitte à faire plus tard, dans des circonstances plus favorables une cholécystectomie. Dans les autres cas il a pratiqué des cholécystectomies. Certains indices doivent guider le choix du chirurgien—tels le sphacèle, la perforation, les abcès, la péritonite locale ou générale—qui aura pris soin auparavant de déceler les troubles ou les affections organiques dont le patient peut, par ailleurs, être atteint. Ce sont ces mêmes indices et symptômes qui détermineront l'anesthésie qui devra être administrée en prévision de complications post-opératoires possibles et assez fréquentes chez les personnes âgées de plus de cinquante ans. Ces complications sont généralement d'ordre pulmonaire, cardiaque, opératoire ou divers. L'auteur les passe en revue en regard de 93 cas.

L'auteur estime que les morts post-opératoires chez les personnes âgées seront réduites de plus en plus si l'on examine à fond les problèmes cliniques qu'elles présentent et si l'on apporte à les résoudre une thérapeutique chirurgicale attentive, adéquate et conservatrice. PIERRE SMITH

Acromioclavicular Separation. Bosworth, B. M.: *Surg., Gyn. & Obst.*, 1941, 73: 866.

A new method of surgical repair is presented after using it on 4 patients. It is presumptive evidence in upwards dislocation at this joint that the coracoclavicular (conoid and trapezoid) ligaments are completely torn. As Codman has stated, the movements are, "swing a little—rock a little—twist a little—slide a little inwards—act like a hinge" and although these movements are not essential to upper

extremity function they do perform some nicety of unrestricted effort. A special vitallium screw is inserted in the superior surface of the distal 2 to 3 inches of the clavicle directly over the coracoid process and passed through the clavicle and coracoid process to pierce the cortex of this process on its inferior surface. This is done under 1 per cent novocain anaesthesia with the patient seated in a chair. Bosworth claims it allows free, non-strenuous activities within a week but weight-bearing on the upper extremity must not be done for 6 to 8 weeks. It has the advantages over Murray's Kirschner wire from the theoretical anatomical, functional and economical viewpoints.

FRANK DORRANCE

Obstetrics and Gynaecology Gynaecologic Surgery under Local Anaesthesia.

Griffin, E. L. and Benson, R. C.: *Am. J. Obst. & Gyn.*, 1941, 2: 862.

A total of 200 major gynaecological operations were performed without reaction to procaine. In the same series there were two deaths during the post-operative period, neither attributable to the anaesthetic agent. In a control series operated upon under general anaesthesia, there was one anaesthetic death that was considered due to nitrous oxide-ether narcosis.

The morbidity rates for the local and general anaesthesia series were 24.5 per cent and 36.1 per cent, respectively. Post-operative shock was reduced from 12.6 per cent using general anaesthesia to 7.5 per cent using local.

Respiratory infections occurred post-operatively in 4.5 per cent of the local group as compared with 3.2 per cent of the general series. However, pre-operative incidence of respiratory disease in the former was 12.5 per cent and for the latter group 2.5 per cent.

Urinary tract disease occurred post-operatively in 13.0 per cent of patients receiving procaine anaesthesia as against 8.7 per cent of those receiving general anaesthesia. However 3.5 per cent of the local group had urinary tract lesions prior to operation, but none of the patients operated upon under general anaesthesia was so affected.

The average age of patients operated upon under local was 53.0 years, while those of the control group averaged 41.5 years. Fifty-seven patients over 60 years of age were operated upon, using procaine anaesthesia, without an anaesthetic death, and with a mortality rate of 12.7 per cent.

ROSS MITCHELL

Fetal Mortality in Post-maturity. Clayton, S. G.: *J. Obst. & Gyn. of the Brit. Emp.*, 1941, 48: 450.

Nine thousand six hundred and forty-nine consecutive labours were studied in an endeavour to discover how often pregnancy is abnormally prolonged, and if the fetal mortality is higher in post-mature cases.

The fetal mortality among patients in whom pregnancy was prolonged was found to be higher than the ordinary fetal mortality, and the possible causes of this increased mortality are discussed. Evidence of placental insufficiency could not be discovered. The fetal deaths in patients with prolonged gestation were found to be due to congenital abnormalities (13 per cent), disproportion and malpresentation (30 per cent), and primary uterine inertia (30 per cent). In all but 2 cases some definite cause of death was found other than post-maturity *per se*. The frequency with which uterine inertia occurs in post-mature cases (8.4 per cent) is shown to be higher than among normal cases, and the bearing on this treatment is briefly discussed.

Treatment of post-maturity.—The risk of fetal injury in cases in which there is disproportion certainly justifies induction though induction might increase the risk of inertia. It would seem to be unjustifiable to induce labour in patients who are thought to be post-mature, but in which there is no evidence of disproportion, for the following reasons: (1) The uncertainty of any diagnosis of post-maturity. (2) The lack of any definite evidence that placental degeneration causes fetal death. (3) The risk of inertia.

P. J. KEARNS

The Significance of Fetal Environmental Differences. Sontag, L. W.: *Am. J. Obst. & Gyn.*, 1941, 42: 996.

The evidence available in the literature from both animal experimentation and the observation of pregnant women and the children they bear are indications that differences in environment during the fetal period may be of great importance in the development of the child both before and after birth. Such factors as the drugs women use during pregnancy, their nutrition, endocrine status, emotional life and activity level during gestation may contribute to the shaping of physical status, behaviour patterns and postnatal progress of the children they bear.

ROSS MITCHELL

Rupture of the Uterus during Pregnancy.

Anderson, D. F.: *J. Obst. & Gyn. of the Brit. Emp.*, 1941, 48: 518.

An example of rupture of the uterus occurring during pregnancy as discussed in this article is of interest for several reasons: The rupture occurred in the middle phase of pregnancy, not in the later weeks as is more common. It was certainly the result of fibrous degeneration of the uterine wall in a multipara, although many are inclined to doubt that rupture may occur in this manner. The condition, while associated with severe pain of sudden onset, was not characterized by immediate collapse as is so frequently the case. The relation to manual removal of the placenta in the immediately preceding labour is important and emphasizes the care which should

be exercised in such a procedure to prevent damage to the uterine wall. In addition, the uterus had been packed after the manual removal of the placenta. The presence of umbilical discoloration and scapular pain were suggestive diagnostic signs.

The abnormal adherence of the placenta to the posterior wall of the uterus suggests the possibility of difficulty with the third stage of labour in a subsequent confinement in the case of a patient in whom manual removal of the placenta had been found necessary.

Incidentally, this case illustrates the failure of a multipara to secure antenatal supervision even though she had a bad obstetric history.

P. J. KEARNS

Pædiatrics

Stature and Weight of Children of the United States. Meredith, H. V.: *Am. J. Dis. Child.*, 1941, 62: 909.

The author's study is restricted to school boys mostly of 9 and 14 years of age. In his search of the literature he has accumulated anthropometric data from 1890 to 1937. A great many sources are quoted. An attempt has been made to assess the influence of race, socio-economic status and geographic location. The following is his summary in part:

"1. Boys living in the United States today, white and negro, are 6 to 8 per cent taller and 12 to 15 per cent heavier than was the case half a century ago.

"2. White boys of the professional and managerial classes are taller and heavier than those of the unskilled and semiskilled classes. In magnitude the differences appear not to exceed 3 per cent for stature or 6 per cent for weight.

"3. Boys in the United States of various ethnic groups (roughly comparable for socio-economic status, geographic environment and decade examination) in no instance appear to differ in average stature by more than 2 inches. The accessible averages for weight fluctuate so much that they preclude a reasonably precise estimate of the maximum difference for weight among ethnic groups.

"4. Averages for stature and weight vary but slightly for white boys residing in different parts of the United States."

It is perhaps to be remarked that increase in height and weight, which seems to have been gradually occurring during the past 50 years, is not necessarily an index of improving health. As a matter of fact the reasons for this increase are rather obscure.

FRANK G. PEDLEY

Caloric Requirements of Full-term and Pre-mature Infants in the Neonatal Period. Mackay, H. M. M.: *Arch. Dis. in Child.*, 1941, 16: 166.

It is the author's opinion that the caloric requirements of new-born babies is a much

neglected subject and about which diverse opinions exist.

A formula is suggested whereby the food intake of new-born babies may be regulated. According to this plan the baby should receive on the first day of life, calories equivalent to $1/7 \times 50 \times$ birthweight in pounds and his feeds should increase by this same amount each day of the first week so that by the seventh day of life he would be given 50 calories per pound birthweight. The importance of using these figures simply as guides is emphasized rather than to enforce a rigid system of feeding. It is pointed out that the formula overestimates the intake of normal breast-fed babies, during the first two days when the secretion is scanty.

The caloric intake of 20 breast-fed infants compared favourably with the quantities required, calculated from this formula taking breast milk as 20 calories to the ounce. Similarly one hundred and seven premature babies who had their food intake checked and guided by the formula averaged one ounce over their birthweight at 10 days old.

The author feels that the adoption of such a scheme for calculating the approximate caloric needs of new-born babies would bring about a fall in the neonatal death rate. K. L. MCALPINE

Neurology and Psychiatry

Cerebral Arteriography. Gross, S. W.: *Arch. Neurol. & Psychiat.*, 1941, 46: 704.

The objections to cerebral arteriography and its relative neglect by American neurosurgeons are due to the toxicity and potential hazard inherent on the use of thorotrast. The author has demonstrated that diodrast is a safe and satisfactory contrast medium. Diodrast is relatively non-toxic in the quantities used, except for persons who have an idiosyncrasy for iodine compounds. In contrast to thorotrast, which remains indefinitely in the patient's reticulo-endothelial system, diodrast is excreted rapidly by the kidneys. For cerebral arteriography it is recommended that 10 to 12 c.c. of a warm 50 per cent solution of diodrast be injected into the common carotid artery on the suspected side with exposure of a roentgen film during the injection. The procedure is indicated for the detection and localization of intracranial aneurysms, localization of intracranial arteriovenous fistulas, varices, vascular tumours and vascular malformations, for the differentiation of aneurysms and tumours and occasionally for the localization of neoplasms.

FRANK TURNBULL

Pathology and Experimental Medicine

A Possible Paternal Factor in the Etiology of Mongolism. Lipnitzky, S. J. and Boshes, B.: *Arch. Neurol. & Psychiat.*, 1941, 46: 174.

In view of all the theories which have been advanced to explain mongolism, most of which

attribute a marked influence to the maternal organism the family reported by these authors is of interest. Here two brothers were father each to a mongoloid imbecile. Unfortunately, nothing is said as to the ages of the mothers of these children, as to the number of pregnancies which they had experienced, as to whether the mothers were related to each other or were related to their husbands. A few of these facts would have been pertinent to the discussion. The observation of these authors is, however, not opposed to the idea that the basis for appearance of mongolism is more a genetic one than one influenced by maternal age.

MADGE THURLOW MACKLIN

Therapeutics

Use of Vitamin B Complex in Cirrhosis of the Liver. Patek, A. J., Jr. and Post, J.: *J. Clin. Investigation*, 1941, 20: 481.

Il semblerait y avoir une relation entre l'apparition des déficiences nutritives vitaminiques et la cirrhose du foie. La cirrhose de même que le bérubéri et la pellagre, est souvent associée à l'alcoolisme chronique. La déficience de certains facteurs alimentaires contenus dans la levure serait responsable de certaines dégénérescence graisseuse du foie avec atteinte fonctionnelle secondaire. Les études faites par ces auteurs indiquent une protection contre les hépatotoxines par l'alimentation riche en levure ou riche en protéine.

Cinquante-quatre cas souffrant de cirrhose furent traités par une diète riche en protéine et en levure et par des injections intramusculaires d'extrait hépatique concentré. L'évolution clinique de ces malades a semblé beaucoup plus favorable que celle remarquée chez 386 autres cas de cirrhose n'ayant pas subi ce traitement.

Les auteurs suggèrent l'hypothèse suivante: la déficience de certains facteurs alimentaires conduisant au développement de la cirrhose, ou encore le fait que le foie étant en état de malnutrition devienne plus vulnérable à certaines toxines dont il disposerait dans les conditions normales.

YVES CHAPUT

Failure of Liver Extract and Vitamin B₁ in Ulcerative Colitis. Shiffer, P. and Ferguson, L. K.: *Am. J. Digest. Dis.*, 1941, 8: 300.

Depuis quelque temps déjà l'extrait hépatique a été utilisé comme traitement adjuvant de la colite ulcéreuse du type idiopathique. Récemment, dû à l'emploi réussi de la vitamine B₁ dans plusieurs types de diarrhée par insuffisance vitaminique, la combinaison d'extrait hépatique et de vitamine B₁ a été préconisée comme traitement de la colite ulcéreuse. Pour en éprouver l'efficacité, les auteurs ont traité douze patients représentant tous les stades de cette maladie avec une combinaison d'extrait hépatique et de vitamine B₁. De ces douze patients, un seul bénéficia d'une amélioration

qui aurait pu être due à ce traitement. Mais au cours d'une poussée subséquente le même malade soumis au même traitement n'obtint aucun résultat. Et les auteurs concluent en faisant remarquer que l'emploi de l'extrait hépatique en combinaison avec la vitamine B₁ n'apporte aucune contribution au traitement de cette maladie rebelle, et n'est par conséquent d'aucune utilité aux malades.

YVES CHAPUT

Hygiene and Public Health

Tuberculous Infection in Relation to Tuberculin Sensitivity in School Children. Gass, R. S., Murphy, W. J., Harrison, E. F., Puffer, R. R. and Williams, W. C.: *Am. J. Public Health*, 1941, 31: 951.

This is a report of a survey of 9 white and 3 coloured schools in Williamson County, Tennessee, by tuberculin test and x-ray. It would appear that calcified lesions in the chest as demonstrated by x-ray are present in a greater proportion of individuals in this area than elsewhere.

Old tuberculin was used first with 0.01 mg. and, if negative, with 1.0 mg. strength. In a survey conducted in the spring of 1937 the results of which have been previously recorded, calcified lesions in the chest were noted with about equal frequency in tuberculin positive and tuberculin negative reactors. The survey reported in this study was carried out in the spring of 1939 and consisted of a simultaneous study by tuberculin test and x-ray of 1,132 white children and 280 coloured children.

Four hundred and fifty-three (40 per cent) of the white children were positive to 0.01 mg. or 1.00 mg. of old tuberculin. Of these 55 per cent showed probable calcification in their lungs. Six hundred and seventy-nine children were negative to tuberculin, and of these 49 per cent showed probable calcification. The difference is not great. If the figures are presented another way it is shown that of 121 extensive calcification cases only 33 per cent showed positive tuberculin reactions.

Five hundred and seventy-three children studied in the later survey had been studied in 1937. A comparison of their x-ray findings shows that of 343 children classed as showing calcification in 1937, 327 were still classed as positive in 1939, but 16 had become negative. Of 230 children classed as negative in 1937, 46 had become positive in 1939.

These same 573 children also showed some changes in their tuberculin reactions. Two hundred and thirty-five had been positive to 1.0 mg. or less of tuberculin in 1937; 84 of these had become negative in 1939; 338 had been negative in 1937; 73 of these had become positive in 1939.

The study shows a mobility of tuberculous infection which is, perhaps, not always appreciated. Calcified lesions seem to disappear and positive tuberculin reactions to become nega-

tive. The use of the tuberculin reaction as a guide to past tuberculous infection cannot be considered wholly reliable. These conclusions are based of course on the assumption that calcified lesions in the lungs are evidences of tuberculous infection.

FRANK G. PEDLEY

Obituaries

Dr. Casey Albert Wood, formerly of Montreal, died at La Jolla, California, on January 26th, aged 85. Born at Wellington, Ont., in 1856, he received his M.D. degree from Bishop's College, Montreal, in 1877. He had, however, managed to attend Osler's lectures at McGill and was a clinical clerk under him at the Montreal General. He was thus one of the earliest pupils of Osler, and remained his lifelong friend. After graduation he practised at Montreal until 1886, being professor successively of pathology and of chemistry at Bishop's, and attending physician to the Western Hospital.

Becoming interested in diseases of the eye, he then spent several years in post-graduate work in France, Germany and England, and in 1890 he settled in Chicago where he became one of the leading ophthalmologists of the Middle West, and was professor of ophthalmology at Northwestern University in 1900, and at the University of Illinois, 1904-25. When the U.S. became involved in the war in 1917, he served with distinction at Camp Sherman and in the Surgeon-General's Office at Washington. He was a prolific contributor to periodical literature, editor of the *Ophthalmic Record* and the *Annals of Ophthalmology*, issued a textbook on "The Commoner Diseases of the Eye" (1897), and was editor and chief author of the "American Encyclopædia of Ophthalmology", 1908-12, and of two "Systems" of the subject.

Meanwhile he had become interested in comparative ophthalmology, and after the war he made his home in California but travelled and lived for years in South America, Australia, the South Seas, India and Ceylon, making himself the leading authority on the eyes of birds and a distinguished ornithologist and naturalist. Among his best known works in this field are, "The Fundus Oculi of Birds", 1917, and his monumental "Introduction to the Literature of Vertebrate Zoology", which embodies a useful list of all works available (largely his own donations) at McGill.

Always interested in the history of his subjects, the last ten years of his long and variegated life were spent largely at Rome and at the Vatican Library, in mediæval and Arabic studies. In 1929 he translated the tenth-century work of Benevenutus Grassus on eye diseases and in 1936 the "Memorandum Book" of the Arabian oculist, Jesus Haly. His last work, not yet published, was a translation of the great mediæval "Falconry" of Frederick II.

Few of its genuine alumni have been so generous to McGill, which granted him its M.D. in 1905 and its LL.D. in 1922. He built up some really great collections at McGill, the Blacker Library of Zoology and the Emma Shearer Wood Library of Ornithology, the former called after the friend who helped furnish the funds and the latter after his wife, who survives him. His ophthalmological collections he gave to the McGill Medical Library, which is consequently one of the richest in the world, especially in the periodical literature. He also gave a number of valuable oriental manuscripts to the Osler Library. Among his other benefactions is the Wood Gold Medal for the best examination in clinical subjects.

Another testimony to his erudite versatility is the "Physician's Anthology" which he and Garrison edited in 1919 and dedicated to Osler.

Dr. René Bolte, of Montreal, died on February 14, 1942. He was professor of anatomy in the University of Montreal. Born in Montreal, Dr. Bolte, who was in his 34th year, graduated from the University of Montreal with the degree of M.D. at the age of 23 and was considered as one of the most promising of the province's young doctors. After having acted as intern at the Hotel Dieu, he left for Europe.

Dr. Robert Almon Brehm (Dalhousie '98) L.R.C.P. (Lond.), M.R.C.P.(Eng.), died on February 7, 1942, aged 71 years, at St. John's, Newfoundland. Dr. Brehm was the son of the late Robert A. and Mrs. Brehm and was born in Halifax, N.S. In 1903 Dr. Brehm was appointed Medical Health Officer of St. John's, Newfoundland, and carried on this duty up to the time of death. For many years he was Government Public Health Officer, for the island dominion.

Dr. John Harold Burgess, of Ottawa, and for the past eight years an anæsthetist at the Ottawa Civic Hospital, died on January 19, 1942. He was born in 1901 and a graduate of the University of Toronto (1926).

Dr. N. Chasanoff, of Smeaton, Sask., died in the Winnipeg General Hospital on February 9, 1942, after a lingering illness. Born in Selkirk, Man., twenty-five years ago, he was educated there and in Manitoba University. He graduated in medicine in 1940, and after serving a year as senior intern in the Children's Hospital, Winnipeg, he practised at Smeaton. He is survived by his parents, his widow, a brother F. O. Jay Chasanoff, R.C.A.F., and a sister. Many of the practitioners in Winnipeg will recall him as an intern in the General Hospital and the Children's Hospital. Keenly interested in sports, he had a fund of high spirits which made him a general favourite. He was a hard worker and his untimely death cut short a life that held great promise.

Capt. Hugh Ratcliffe Inksater, of Calgary, died overseas in an accident on January 18, 1942. No details are available at the moment. He was born in 1906 and a graduate of Toronto University (1930).

He was a young Calgary surgeon, born in St. Catharines (1906) and educated at the University of Toronto. Dr. Inksater was well-known in Toronto, having been connected with the Toronto General, St. Michael's and the Hospital for Sick Children in addition to having served on the staff of the Banting Institute. He specialized in surgery. His post-graduate work was done at the three Toronto hospitals and he went to Calgary in 1935. He had been overseas two months.

Dr. John Robert Irwin, of Cobourg, Ont., died on or about January 13, 1942. He was born near Port Hope, Ont., in 1878, and was a graduate of Toronto University (1902). He was also M.R.C.S.(Eng.), 1905.

He practised in Cobourg and Rochester before retiring. He was a captain in the Medical Corps in the last war and was awarded the Military Cross for distinguished service in the field.

His military record is given in the Roll of Service of the University of Toronto as follows: R.A.M.C., Lieut., Aug. 1915; France, Oct. 1915. No. 16 Gen. Hosp., Le Treport; No. 19 Fd. Amb., 33rd Div., Nov. 1916; M.O. 2nd Worcester Regt., May 1916; Cuinchy-Givenchy sec. (1915-16), Somme (1916), Coucy Forest (1917); C.A.M.C., St. Med. Bd., Folkestone, Capt., Aug. 1916; No. 9 Can. Sta. Hosp., Mar. 1917; France, Aug. 1917 att. Can. For. Cps.; No. 2 Can. Gen. Hosp.; att. No. 47 Impl. Gen. Hosp., Jan. 1918; No. 12 Can. Gen. Hosp., Apl. 1918; Invalided Oct. 1918; i/e Surgery, Sask. Mil. Hosp., Moose Jaw; M.C. Cuinchy June 28, 1916.

Dr. George Whitfield Knipe. The recent sudden death of Dr. Knipe, of Vancouver, came as a shock to all who knew him. Dr. Knipe was an Irishman, a well-trained physician, a man of very high character, and a man of many parts. He was an amateur actor of no small merit, and deeply interested in art and literature. The annual meeting of the Dickens Society of Vancouver, of which he was president, was to have met on the evening of the day he died and had to be cancelled.

Dr. Knipe was born in 1876 and a graduate of the National University of Ireland (1906). He also held the qualifications of F.R.C.P. and F.R.C.S. of Edinburgh (1906).

Dr. Frederick Alexander Logan, medical superintendent of the Toronto General Hospital, died suddenly on February 7, 1942. He was 47 years of age.

Dr. Logan had been medical superintendent of the Toronto General Hospital since January, 1938, and was popular with all members of the staff.

Born and educated in Niagara Falls, Dr. Logan graduated from the University of Toronto Faculty of Medicine in 1920. For many years he practised medicine in Lindsay, Ont. During the first Great War he served a year with the Royal Navy as surgeon probationer. A member of the Rotary Club, he was keenly interested in work for crippled children. He served as president of the Ontario Society for Crippled Children in 1937-38. He was a member of the Ontario Medical Society, and the Toronto Curling Club. During collegiate days he won recognition as an athlete.

Dr. John Burton Lynch (College Physicians and Surgeons, Baltimore, 1902), of Bell Island, Newfoundland, died after a short illness at St. Clare's Hospital, St. John's, Newfoundland, on January 30, 1942. He was born in New Brunswick and was 65 years of age. Dr. Lynch spent forty years in general practice in Newfoundland, first at Lamaline and Placentia, and the last twenty-seven years at Wabana, Bell Island, where he also acted as company doctor, to the ore mines. He took an active interest in the Newfoundland Medical Society. Among the survivors, is his son Dr. J. G. Lynch, otolaryngologist and ophthalmologist of St. John's, Newfoundland.

Dr. Wilfred Gilmour Reive, of Welland and Welland's Medical Officer of Health, died on January 22, 1942. Born in Markham 59 years ago, he attended public and high schools there and graduated from the University of Toronto, in medicine in 1904. He practised at Arthur, Ont., until coming to Welland in 1918.

Dr. George Tillerie Ross, of Montreal, well and widely known in his day as an otolaryngologist, died on January 25, 1942, in his ninety-second year.

Dr. Ross was a native of Troon, Ayrshire, Scotland, and was educated in Canada. He was a graduate of McGill University (1880). He was for many years head of the otolaryngologist department of the Western General Hospital, Montreal (now the Western Pavilion of the Montreal General Hospital). He served with the Prince of Wales Fusiliers in the Riel Rebellion.

Dr. Franklin Sheldon Ruttan, Medical Officer of Health for Woodstock, Ont., since 1913, died on January 12, 1942.

Dr. Ruttan had lengthy service in the first Great War with the R.C.A.M.C. He went overseas in 1914, going to France in 1915 on the staff of the Second Field Ambulance and serving through the battles of Festubert and Givenchy as medical officer of the First Battalion. He was later attached to No. 1 Canadian General Hospital at Etaples, coming home with the rank of major.

Born in Sydenham, Ont., he was educated at Queen's University (M.D. 1893). Before coming to Woodstock in 1906 he practised at Middleville, Wolfe Island and Yarker.

News Items

Alberta

The Council of the College of Physicians and Surgeons recently suspended a member of the profession until the next meeting in Calgary on account of excessive prescribing of narcotic drugs.

There is a suggestion that as soon as information comes to hand that a member of the profession has had his name put on the proscribed list by the Narcotic Drug Department, Ottawa, he will be suspended automatically until the next meeting of the Discipline Committee, when his case will be enquired into. If this proceeding were followed by all the Councils in Canada, it would strengthen the hands of the Department in its efforts to put down illegal traffic in narcotics.

The following is a list of new registrants in Alberta: Leo Lincoln Leveridge, Alvin Cyril Walsh, Lauren I. Seaman, Brian James Murphy, Arthur Lowndes Yates, Hubert John Muth, Donald Gordon McQueen, William Allen Hervey, Elizabeth Akhurst, Anathalie Heath.

The Council of the College of Physicians and Surgeons after much consideration, decided that the fee for proper medical examinations, for the Provincial Government Life Insurance, should be a minimum of \$5.00. The suggestion by the Department that the urinalysis be made in Edmonton was not considered wise or the saving of work by the examining physician.

The Council made the following grants to the University of Alberta: scholarships, \$250.00; medical library and catalogue, \$250.00; history of medicine, \$100.00.

It is noted that the Cancer Clinics are to provide surgical services for cancer patients, under certain well defined conditions. The Council is of the opinion that the capable surgeons of the province will be allowed to do the surgery at the request of the patient and this work not be limited to a single surgeon in each of the two cities where the cancer clinics are established.

The annual report of the Council of the College of Physicians shows an expenditure of \$15,448 on ordinary work; \$5,688 of this was spent by the Alberta Division of the Canadian Medical Association. This provided journals for the physicians, financed the refresher course at the University of Alberta, paid the expenses of speakers to the district meetings and financed the annual meetings of the C.M.A. Alberta Division.

A special committee of the eye specialists met the Compensation Board recently in reference to eye injuries. They have made several recommendations, and suggested some advances in fees for their special work in connection with accidents. The decision of the Board has not yet been made known.

British citizenship has been suggested as a requirement for Alberta registration, but the Council, while considering it, took no action. G. E. LEARMONTH

British Columbia

The drain on the medical population continues as time goes on, and our ranks are becoming somewhat thinned. Some centres have felt this particularly, and yet it is hard to see what can be done about it. One of the more serious consequences is the gradual disappearance through enlistment of men doing special work, e.g., internal medicine, neurology, orthopaedics, especially the latter, though the list of eye, ear, nose and throat men is also shrinking rapidly.

Doctors of North and West Vancouver have been organized into teams for duty at the hospital for A.R.P. and F.A. duty. In Vancouver, St. Paul's Hospital has a very complete organization, especially for fire-fighting. Other hospitals in Vancouver, Victoria, New Westminster, etc., are similarly organizing.

At a recent meeting of the Provincial Nucleus Committee of the Economics Committee of the Canadian Medical Association, it was decided to circulate a questionnaire throughout the province regarding Health Insurance. After these are sent out, teams from the personnel of the Committee are being organized of speakers to go to all large centres, and explain details, answer questions, gather information and so on. This will occupy the next two weeks.

J. H. MACDERMOT

Manitoba

Dr. W. F. Evelyn, of Stonewall, has been appointed municipal physician for the town of Stonewall and municipality of Rockwood. His duties began February 1st.

At a championship gala on January 26th under the direction of the Manitoba section of the Canadian Amateur Swimming Association, an all-medical team representing the University of Manitoba won the 150 yd. medley relay, in 1 minute, 31 3/10 seconds, to best the old Manitoba record by 1/10 second. The winning team was composed of Colin Ferguson, Joe Hall and Cockburn McCallum. Colin Ferguson, who is President of the University of Manitoba Athletic Board of Control, won the men's 100 yard free style event, and Joe Hall won the men's 50 yard backstroke race.

Recently two men were sentenced, by Judge Whitla in the county court, to two years' imprisonment for stealing a surgical case containing instruments and morphine. The case was stolen from Dr. E. Johnson at Selkirk, and both men had long criminal records.

Five army doctors and two army dentists of M.D. 10 have qualified for the rank of captain, after taking examinations last month, military authorities announced. They are Lieuts. D. A. Davidson, J. B. Cram, H. R. Murphy, W. F. H. O'Neil and D. G. Revell, all of the Royal Canadian Army Medical Corps, and Lieuts. A. A. Rabinovitch and G. Neptune, both of the Canadian Dental Corps.

Capt. J. B. Cram, Royal Canadian Army Medical Corps, has been appointed medical officer of the 100th Basic Training Centre at Portage la Prairie.

After twenty years as director of the social service department of the Winnipeg General Hospital, Miss Stella J. Pollexfen has given up her position. Miss Pollexfen tendered her resignation in October, but, due to the pressure of work, she was prevailed upon to remain until January 20th.

Findings made by Dr. Carl E. Buck, director of the American Public Health Association, in an investigation of all phases of the provincial health and public welfare services, were the subject of a conference between the Manitoba government and Dr. Buck on January 21st.

Dr. Buck will embody his findings in a report which will be submitted to the legislature after the session resumes February 17th. The report is expected to lead to some radical changes in the health services and in hospitalization.

Hon. James McLennan, attorney-general and minister of health and public welfare, stated that Dr. Buck's survey was made without cost to the province through the American Public Health Association.

ROSS MITCHELL

New Brunswick

Dr. R. D. Baird, who previously practised in Queen's County, N.B., has been granted his F.R.C.S. by Edinburgh University. For the last two years Dr. Baird has been studying in Great Britain and recently has been commissioned in the Royal Army Medical Corps.

Among the physicians in New Brunswick engaged in services for the second Canadian Victory Loan are: Honorable Murray McLaren, C.M.G., Dr. D. C. Malcolm, of Saint John, and Dr. J. C. Webster, C.M.G., of Shediac, N.B.

Dr. A. T. Leatherbarrow who for many years has practised in Hampton, has been appointed to the Medical Staff of the Department of Pensions and National Health, at Lancaster Hospital, Saint John, N.B.

Dr. E. V. Sullivan, lately of St. Stephen, has been appointed to the Medical Staff of the Provincial Hospital at Fairville.

Dr. E. S. Bridges, who has practised in Saint John since the last war, has been appointed Medical Adviser to the Pension's Commission at Ottawa.

Dr. A. M. Sormany has been elected president of the Edmundston Board of Trade.

Dr. P. C. LaPorte, of Edmundston, is County Chairman of the organization in Madawaska County for the second Canadian Victory Loan.

Dr. Eli W. Ewart, of Moncton, has been appointed by the provincial government as a provincial consultant to aid in the treatment of paralysis cases arising out of the recent polio epidemic.

Dalhousie University has conferred associated professorships on three staff physicians at the Saint John General Hospital: in medicine, Dr. N. Skinner, in surgery, Dr. Geo. Skinner, in obstetrics, Dr. Geo. White. These physicians will supervise the medical education of Dalhousie students serving their intern year in the Saint John General Hospital.

Mr. Justice Richards, of New Brunswick Supreme Court, has handed down his decision in a malpractice law suit brought against Dr. G. I. Nugent, of Fredericton. This case concerned an alleged negligence in the treatment of a fracture by Dr. Nugent. It was proved at the trial that Dr. Nugent had shown particular care and diligence in his handling of this case and had received the advice of competent consultants and had made use of x-ray examinations in the treatment of this case. Dr. Nugent was represented by the Canadian Medical Protective Association. His colleagues in New Brunswick congratulated him on the successful outcome of this unhappy suit.

The regular January meeting of the Saint John Medical Society was replaced by a special meeting at which Colonel Edward Archibald, from Military Headquarters at Ottawa, was the speaker. Dr. Archibald reviewed the old and new treatment of war wounds and skilfully engineered a discussion which was most interesting. The medical officers of the garrison were special guests of the Saint John Medical Society at this meeting.

Capt. W. C. Whiteside, of Edmonton, who at present is a surgical specialist at this eastern Canadian port, has recently been promoted to the rank of major.

A. STANLEY KIRKLAND

Nova Scotia

Dr. Lewis Nelson Morrison, of Mahone Bay, Dalhousie (1925), is among those unreported since the loss of the *Lady Hawkins*. Dr. Morrison was serving as ship's surgeon.

Overcrowded hospitals throughout the province have resulted in a wave of expansion. The Hamilton Memorial at North Sydney has recently opened a new wing. At New Glasgow a \$300,000 expansion of the Aberdeen Hospital is planned, while at nearby Stellarton plans are mooted for the erection of a new building. The Sutherland Memorial Hospital at Pictou is seeking more room, as is the hospital at Truro. At Halifax the new, permanent, naval hospital nears completion and plans for the new Victoria General develop.

Dr. N. B. Dreyer, former professor of pharmacology at Dalhousie and one time scribe of this column, was pictured in a recent issue of *Life*. A passenger on the ill-fated Egyptian liner *Zamzam*, Dr. Dreyer appeared as one of many in the infamous *Hatch 2* of the German prison ship *Dresden*. To judge from his expression Dr. Dreyer seemed to be accepting the experiences with his customary *sang froid*.

A general survey of Halifax's health administration is being conducted by Dr. D. B. Wilson, of the Rockefeller Institute.

Mayor Dr. G. K. Smith, of Hantsport, has been elected by acclamation to his twelfth year of office.

Speaking on the nutritional survey of Halifax conducted in 1939, Dr. E. G. Young, Dalhousie professor of biochemistry, stated that amongst families in the \$450 to \$1,500 income group diets were inadequate, particularly in calcium and vitamins. Amongst these groups almost half of the annual income was spent on food—\$2.21 per person, per week. Consumption of fish and apples was high, of white bread and cheese, low, of milk, deplorably low. In general, said Dr. Young, Canadian diets may be improved by the adequate use of whole grain cereals, carrots, beans, citrus fruits, cheese, fresh green and yellow vegetables, milk, dark molasses, liver, certain pork products, peanut butter, tomatoes, and potatoes.

ARTHUR L. MURPHY

Ontario

The Provincial Minister of Health has released a report on the chief causes of death during 1940 as compared to the previous year. He points out that the proportion of the population in the older age groups, sixty years and over, is increasing each year. There has been a decrease of deaths from tuberculosis, pneumonia and bronchitis in the earlier age groups, and a definite drop in infant mortality. The death rate from tuberculosis has reached a new low of 26.9 per hundred thousand; 39.9 per cent of all deaths are recorded as being due to diseases of the heart, arteries and kidneys. Cancer in 1940 ranked third amongst the causes of death. One-third of the cancer deaths occurred in age-groups under sixty. It is recorded that over 2,000 cancer cases are being treated each year in the seven Ontario Cancer Centres. Accidents as a cause of death appear to be on the increase. In 1940, 2,530 deaths, an estimated rate of 67.2 per hundred thousand population, were classed as accidents. The deaths from pneumonia and bronchitis continue to show a marked decrease. Attention is drawn to the striking decrease in infantile mortality. As recently as 1915 the loss of life among infants in one year in Ontario stood at 74 per one thousand live births. In 1940, this rate is decreased to 43 per one thousand live births.

Dr. Gordon P. Jackson, M.O.H. for Toronto and Controller of Medical Services for A.R.P., has issued a call for all graduate nurses in the Toronto district to register for voluntary service in case of national emergency. Whether married or single, whether able to serve only part time, all graduates are asked to register. A basic course in medical A.R.P. work has been offered these nurses.

Lt.-Col. R. W. I. Urquhart, R.C.A.M.C., who has spent two years on active service in England with No. 15 Canadian General Hospital, has been released to take over the work of the University of Toronto Health Service made vacant by the retirement last spring of Dr. Geo. D. Porter, who was succeeded for a short time by Major C. D. Gossage, now returned to active service.

A three-day post-graduate medical course was given in January at the University of Toronto on the subject of deaths in industry. In addition to deaths, the lectures covered such subjects as health supervision, accidental wounds, injuries, and burns, dust in industry, skin diseases due to industry. This course has followed a similar special course for industrial nurses which was given by the School of Nursing of the University.

The attention of the profession should be drawn to recent convictions of druggists on the charge of selling narcotics without first obtaining a written prescription from a doctor. In addition to reports already made, we now wish to report a druggist who was fined \$600 on three charges. The first charge concerned a prescription containing heroin and was furnished to a patient on a telephone order of a physician. The druggist claimed the doctor promised to send the prescription the next day. The second conviction was for dispensing dionin without a proper written order from a doctor. In this case, the doctor telephoned the prescription. The druggists did not possess it in writing. The third conviction was due not to a druggist being asked to break the law but to his supplying morphine without a written prescription. The druggist made the defence of having been asked by a physician to fill the prescription. The name given by the druggist was not to be found on the Ontario Medical Register.

After nine months of operation, the Plan for Hospital Care conducted by the Ontario Hospital Association, now announced that it has 50,000 men, women, and children enrolled.

A delegation recently appeared before the Minister of Health and Members of the Cabinet asking for legislation which would permit rural municipalities to levy taxes for municipal health services. There were some fifty representatives from all parts of the Province. The system of rural health services has been adopted in some municipalities. The request is for legislation which would enable the municipality to put the cost in the tax rate.

J. H. ELLIOTT

Quebec

La Société Médicale et la Société Dentaire de Montréal ont donné mardi, le 17 février dernier, à l'Ecole Dentaire une séance conjointe entièrement consacrée aux rapports de la nutrition et de la dentition.

C'était là une heureuse initiative du Comité des Programmes de la Société Médicale, que dirige avec autant d'intelligence que de dévouement le Dr Paul Letondal.

Au cours de cette réunion qui fût présidée par les Docteurs G. L. Prud'homme et Gérard de Montigny, le point de vue biologique fût exposé par le Dr Donat Voghel, le point de vue médical par le Dr J. E. Sylvestre, le point de vue dentaire par le Dr Gustave Gauthier et le point de vue orthodontie par le Dr Paul Geoffrion.

Cette séance, qui était sous la présidence d'honneur de l'Honorable Henri Groulx, Ministre de la Santé et du Bien-Etre Social, représente une importante contribution à la présente campagne de Nutrition organisée par le Gouvernement Canadien.

A l'hôpital Notre-Dame de Montréal, le Dr L. A. Magnan a été récemment promu chef-adjoint du service de gynécologie; le Dr L. C. Simard a eu la même promotion au laboratoire d'anatomie-pathologique.



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Le nouvel exécutif de la Société Médicale de Montréal pour l'exercice 1942 est le suivant: Président, Dr G. L. Prud'homme; Vice-président, Dr A. Groulx; Secrétaire-trésorier, Dr Paul Letondal, réélu pour un quatrième terme.

Les cliniques de Dermato-syphiligraphie de l'Université de Montréal inaugurent une série de leçons qui auront lieu alternativement à l'hôpital Notre-Dame et à l'Hôtel-Dieu, et au cours desquelles les principales affections de cette spécialité seront passées en revue. Ces cours spéciaux, destinés aux praticiens, ont débuté le 12 décembre dernier et se poursuivront jusqu'au 24 avril prochain. Ils sont confiés aux Drs A. Marin, P. Poirier, F. L. Boulais et A. Lambert.

A l'hôpital Ste-Justine de Montréal, les Drs J. E. St-Onge, Gaston Lapierre, Henri Baril, Lucien Coutu et Willie Major ont été élus au Conseil Médical. Le Dr Edmond Dubé, Directeur médical, fait partie *ex officio* du Conseil. Au Bureau médical, le Dr A. Z. Crépeau fut élu président tandis que le Dr H. Trudel demeure secrétaire.

L'Union Médicale du Canada a élu à la présidence de son exécutif le Dr L. J. Petitclerc de Québec. Les Drs D. Marion et C. A. Gauthier deviennent vice-présidents. Les autres postes demeurent les mêmes.

La Société Médicale de Québec a élu le nouveau bureau suivant: Président, Dr C. A. Gauthier; Vice-présidents, Drs H. Lapointe et E. Gaumond; Trésorier, Dr J. Tremblay; Secrétaire, Dr de la Broquerie Fortier; Directeurs, Drs R. Rainville et Bissonnette.

Le Dr J. A. Couillard, surintendant du Sanatorium de Mont-Joli et le Dr J. A. Vidal, chef de service à l'hôpital du Sacré-Cœur viennent d'être nommés respectivement président et vice-président du Comité provincial de défense contre la tuberculose.

JEAN SAUCIER

Lecture Course on Canadian Welfare Services.—A course of fifteen two-hour lectures by Miss Charlotte Whitton, C.B.E., M.A., D.C.L., LL.D., on "Evolution of welfare services in Canada" will be given at the Montreal School of Social Work, from February 23 to March 25, 1942. The lectures are designed to give a comprehensive picture of public welfare and public assistance in Canada.

A historic and geographic background showing the influence of early settlement on the development of welfare provisions will be followed by a discussion of state responsibilities for social wellbeing. The subjects covered will include protection of children, employment services, unemployment insurance, social insurance, public health and other special services. Administrative problems in the social services at Dominion-Provincial and Municipal levels and the relationship between public and voluntary efforts in welfare services will be considered, as well as points on the administration of justice with special mention of juvenile and family courts.

Dr. Whitton, until recently Executive Director of the Canadian Welfare Council, has seen the growth of these public services in Canada and played an active part in developing them.

The lectures will be held at the School on Mondays, Tuesday and Wednesdays, from 4 p.m. to 6 p.m., and the fee for the course will be \$5.00. Registration should be made through the Montreal School of Social Work, 3600 University Street, Montreal, before February 19, 1942.

Twelve hospitals on the Island of Montreal have already accepted the conditions of the Quebec Hospital Service Association and are willing to enter into contract to provide group hospitalization according to the association's non-profit plan, it was disclosed here recently.

The hospitals include the central and western divisions of the Montreal General Hospital, Royal Victoria, St. Mary's, Jewish General Hospital.

Dr. J. C. Meakins, Dean of the Medical Faculty of McGill University, has been elected joint-president of the Health League of Canada, it was announced after an executive meeting held recently. Dr. Meakins succeeds Major D. J. O'Donahoe, whose duties in Ottawa at the present time forced him to resign.

Senator Leon Mercier Gouin, Walter A. Merrill, K.C., Mayor of Westmount, J. C. Kelly, George Watt and Mrs. A. K. Hugessen were elected as new members of the executive, while S. C. Dobson, and Walter Molson were named members of the general committee.

At the meeting mentioned Lionel E. Brittle, organizer of the financial campaign, announced that \$24,405 had been subscribed in the Province of Quebec, mostly in Montreal, and that the campaign would continue in Quebec, Three Rivers and Sherbrooke.

Dr. Gordon Bates, general director of the League, outlined the program of activities for 1942. The principal objective this year, he said, would be the pasteurization of milk, although the League would continue with its objectives in regard to nutrition, prevention and cure of venereal diseases, prevention of diphtheria and industrial hygiene.

Dr. Albert LeSage, joint-president presided at the meeting. Others who attended were: Senator Gouin, Dr. J. A. Beaudouin, Mrs. L. G. Beaubien, Dr. H. Abramovitz, Dr. C. C. Birchard, M. J. C. Kelly, Dr. Gaston Lapierre, Dr. J. H. Charbonneau, Alfred Charpentier, Lt.-Col. Elzear Hurtubise, Dr. Adelard Groulx, Rev. F. H. Wilkinson, Roy Campbell, George Watt and Emile Vaillancourt, secretary of the League.

Saskatchewan

At the meeting of the Council of the College of Physicians and Surgeons of Saskatchewan, held January 21, 1942, the following resolution was passed: "That the report of the Nominating Committee of the Annual General Meeting be accepted, substituting Jasper, Alberta, for Regina, Saskatchewan, as the next place of meeting, and the name of Dr. R. A. Dick for that of Dr. D. G. MacQueen, who was moved to Edmonton, as one of our representatives to the Canadian Medical Association Council as follows:

Place of next annual general meeting—Jasper, Alberta (in conjunction with and at the time of the Canadian Medical Convention in June, 1942).

Representatives to Canadian Medical Association Council: Dr. J. B. Ritchie, Regina; Dr. R. A. Dick, Canora; Dr. J. F. C. Anderson, Saskatoon; Dr. F. C. Heal, Moose Jaw; Dr. J. J. Hamelin, North Battleford; Dr. G. Gordon, Rosetown; Dr. G. A. Dowsley, Swift Current.

Representative to Anti-tuberculosis League: Dr. F. W. Hart, Indian Head.

At a recent meeting of the Council of the College of Physicians and Surgeons of Saskatchewan the following resolution was passed: "That the following be Chairmen of Committees and members of corresponding committees of the Canadian Medical Association: Archives, Dr. J. A. Valens, Saskatoon; Cancer, Dr. E. B. Alport, Regina; Constitution and By-laws, Dr. O. E. Rothwell, Regina; Legislation, Dr. W. A. Dakin, Regina; Economics, Dr. D. P. Miller, Prince Albert; Maternal Welfare, Dr. L. A. Chase, Regina; Medical Education, Dr. W. S. Lindsay, Saskatoon; Pharmacy, Dr. M. Powers, Regina; Public Health, Dr. A. Wilson, Saskatoon; Credentials and Ethics, Dr. F. H. Hurlburt, North Battleford; Nutrition, Dr. J. Orr, Moose Jaw; Post-graduate, Dr. C. R. May, Regina."

Dr. S. M. Scott, of Nipawin, has moved to Transcona, Manitoba, and his practice has been taken over by Dr. D. A. D. Wright formerly of Tisdale. Dr. D. G.

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MacQueen of Tisdale has gone to Edmonton, Alberta, with the Department of Pensions and National Health and his practice is being conducted by Dr. C. R. McKinnon and Dr. R. D. Wright, his former assistants, and Dr. F. D. Sutherland formerly of Melfort. Dr. Argyle McMurchy has opened a practice in the town of Melfort.

Dr. J. A. Kitley, M.L.A., of Nipawin, has been accepted in the R.C.A.F. and expects to leave soon.

At a recent meeting of the Prince Albert District Medical Society the following officers were elected for 1942. *President*, Dr. E. A. Frejd; *Vice-president*, Dr. M. F. Savisky; *Second Vice-president*, Dr. J. B. Legault, Domremy, Sask.; *Secretary-treasurer*, Dr. W. R. Swaffield; *Executive*, Dr. H. M. Bigelow, Cudworth, Sask., Dr. B. H. Lyons, Birch Hills, Sask., Dr. J. E. R. LeBlond and Dr. A. M. J. Hynes, Prince Albert.

The committee appointed to study the recent epidemic of encephalomyelitis, under the chairmanship of Dr. D. S. Moore, made its report at the January meeting of the Regina and district medical society.

Dr. F. C. Middleton gave a report on its provincial incidence. Dr. George Walton spoke on the epidemiology of the disease. Dr. U. J. Gareau analyzed clinical symptoms. Dr. D. S. Moore described pathological findings in 12 cases on which autopsies were done also clinical laboratory work on hospital cases. Dr. J. S. Fulton, Veterinary Pathologist of the University of Saskatchewan, reported on laboratory studies on this disease virus.

Under a wartime policy in force at both Regina hospitals no new doctors can be added as associate members to the hospital staffs except under "extenuating circumstances".

A request was received by the Regina General Hospital board from the rural municipality of Lajord asking that Dr. J. B. Mesbur, formerly of that rural municipality, be appointed to the medical staff of the General Hospital. Dr. Mesbur has taken up residence in Regina. The rural municipality of Lajord will be advised that because of the policy now in effect Dr. Mesbur cannot be made an associate member of the General Hospital staff.

The policy was adopted early in the war as a wartime measure to protect the practice of doctors who had left Regina for active service and at the same time prevent an influx of doctors from the country where their services were urgently needed. To date over twenty-five Regina doctors have enlisted and left the city.

As in other hospitals in the Dominion it has been the custom of the board of governors of the General Hospital to receive the recommendation of the hospital's medical staff on applicants before making appointments of new doctors to the staff. Soon after the outbreak of war the medical staffs of the General and Grey Nuns' Hospitals notified the governors of both hospitals that they would no longer recommend new members to the medical staffs except under "extenuating circumstances".

Under the policy there are two "extenuating circumstances" by which a doctor could be added to the hospital staffs.

They are: First, where a doctor enlisted, a doctor whom he had specifically brought into Regina to carry on his practice would be automatically recommended to become a member of the hospital staffs. Second, where it was shown that by enlisting a doctor deprived the public of some important service then a new application to fill such an important position would be acceptable. The latter applied mainly to specialists who by enlisting created a hardship on the public.

Doctors starting to practise in Regina who cannot show they are replacing a doctor enlisted in the armed forces, at his request, or that they are especially needed to serve the public, will not be taken on the hospital staffs.

It was agreed that all new applications from doctors to the hospitals for permission to join their staffs would

be passed on to a special committee of Regina doctors for their study and recommendation. It was felt the committee could make a special study of the situation and that it would result in unanimity in both hospitals. This committee has met on several occasions to consider applications.

LILLIAN A. CHASE

United States

The New York Polyclinic Hospital.—The twenty-three physicians and surgeons deemed to have contributed most toward the creation of Polyclinic Hospital were honoured recently when their portraits were unveiled in the faculty room of the hospital, 341 West Fiftieth Street.

Several hundred staff members, nurses, visiting physicians and other friends of the hospital attended the ceremony or viewed the gallery during the afternoon. A reception and tea followed the unveiling.

Mrs. Victor Harris, chairman of the board of the Social Service Auxiliary of the hospital, officiated at the unveiling of the gallery. The presentation of the portraits to the hospital was by Dr. Orrin S. Wightman, former president of the New York State Medical Society and the New York County Medical Society. A. A. Jaller, executive officer of the hospital, expressed the institution's gratitude for the gift.

Dr. Joseph F. McCarthy, president of the faculty, in officially accepting the gift in behalf of the faculty and the hospital, said the gallery represented a graphic portrayal of the sixty-one year history of Polyclinic Hospital and afforded a constant source of inspiration to practising surgeons and physicians today.

With the exception of six men, Drs. Delavan, Sachs, Whiting, Korley, Wightman and Dillingham, the honoured men are now dead.

The Second American Congress on Obstetrics and Gynecology will be held in St. Louis, April 6th to 10th.

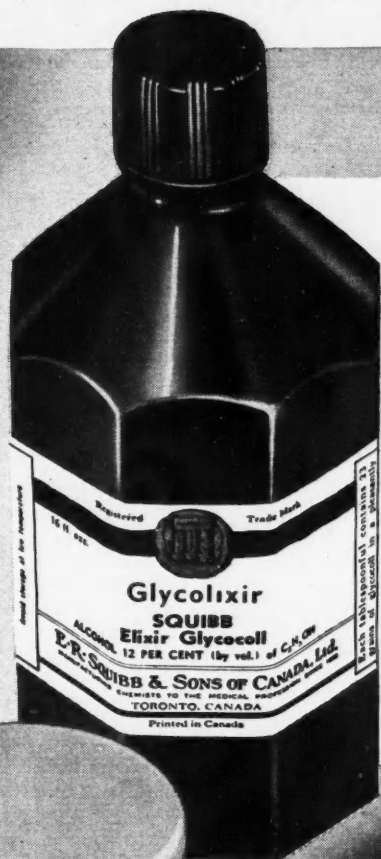
The United States is engaged in a total war effort. There is certain to be a tremendous shift in medical and nursing services from civil to military duties. The Congress will therefore give attention to this problem and over two hundred experts have already agreed to take part in the general program. There will be innovations such as a series of "Obstetric Information Please" Round Tables; Mannikin Demonstrations of Forceps and Breech in multiple and small groups; and Personal Consultation Service throughout the week by appointment. The medical, health, nursing, educational and administrative sections are all to have programs of special and timely interest and importance. The central office of the Congress is at 650 Rush Street, Chicago, Joseph L. Baer, M.D., General Chairman of Publicity.

General

First Polish Graduates in Edinburgh.—There was a historic addition this year to the small winter graduation at Edinburgh University on December 12th, when the first degrees were conferred on students of the Polish School of Medicine at the University. Sir Thomas Holland, the vice-chancellor, presided and the degrees were conferred with the authority of the Polish government by Prof. A. T. Jurasz, dean of the Polish faculty of medicine. The new Polish graduates were Miss Jadwiga Mickiewicz, of Warsaw, Second Lieutenant Stanislaw Sehta, Asp. Wladyslaw Kazimierz Gatuszka and Asp. Ferdinand Solich, all of Cracow.

Plastic Surgery in War Time.—We are informed by the National Film Board of Canada that there is available for the use of Medical Societies in Canada a 35 mm. technicolour print of "Plastic Surgery in War Time". This film was produced in England by John Taylor with the assistance and co-operation of Sir Harold Gillies. The running time is about twenty-five minutes. The film illustrates the importance of plastic surgery in repairing war wounds, and actual case histories are shown.

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Medical Societies wishing to borrow this film for showing locally are advised to address their communications to the National Film Board, Ottawa, and refer to this notice in the *Journal*. NOTE: It should be noted that the film is a 35 mm. one requiring equipment such as is found in an ordinary moving picture theatre.

Book Reviews

The Therapeutics of Internal Diseases. Edited by G. Blumer. Vol. 4, 791 pp., illust.; vol. 5, 765 pp. \$20.00 per set. D. Appleton-Century, New York, 1941.

These two volumes complete this comprehensive work on therapeutics. In many ways it is more like a system of medicine with special emphasis on therapeutics. A strong effort is everywhere made to keep treatment as rational as possible, to base it on a definite diagnosis or understanding of the nature of the disorder and to clear away the fog of empiricism and fanciful medicine.

Volume 4 covers the alimentary system from mouth to anus, and is followed by diseases of the genito-urinary system, including nephritis and hypertension and non-operative gynaecological disorders. The diseases of the blood and blood-forming organs and the locomotor system conclude this volume.

Volume 5 is given over to the nervous system, organic, functional, and psychiatric, metabolism, the endocrines, the skin, allergy and a special new chapter on chemotherapy with the sulfonamides. Although the sulfonamides were already covered in volume 2 it was felt that so much new progress had been made since its publication only a few months ago that a new chapter was justified. This includes the newer derivatives sulfadiazine and sulfaguanidine. Each volume is well indexed and volume 5 contains a general index for the five volumes.

This is an outstanding work. It is to be regretted that arrangements were not made to have it published as a loose leaf system. Revision is so often necessary especially of a subject such as therapeutics. But these volumes are fresh and modern and have an enduring quality.

Accidental Injuries. H. H. Kessler. 2nd ed., 803 pp., illust. \$11.50. Macmillan, Toronto, 1941.

This is the second edition of a monograph first published in 1931. The opening six chapters are filled with valuable information which could only have been accumulated by an author with wide experience. They outline all the principles of compensation for injury and the methods of assessing disability. In a field as complex as disability evaluation, set rules and schedules are impractical. It is all the more important that the principles which may be utilized to guide one in disability evaluation should be clearly defined in order that they may be applied to each case. Dr. Kessler has done this with commendable clarity.

The following ten chapters discuss special injuries to parts of the body arranged regionally. The great value of this section is that it is based upon personal experience carefully analyzed. It means something, for instance, to learn that what Dr. Kessler has to say about fractures of the tibia and fibula is based upon 286 cases. When he further states that not one of these but had some degree of permanent disability for which he was compensated we realize that the surgeon's optimistic assessment of the result of his treatment often is different from the assessment of the patient or of the Compensation Board. In addition to his own experience, which has been great, he draws upon the experience of other countries and constantly parallels American practise with European records.

The last four chapters are devoted to the relationship between injury and disease, always a vexed question; accident neurosis; occupational disease (this is a very full chapter), and a final chapter on rehabilitation.

This is an excellent monograph, invaluable as a reference handbook to all who deal with traumatic surgery, compensation cases and accidents involving medico-legal action.

Society and Medical Progress. B. J. Stern. 264 pp. University Press, Princeton, 1941.

This is a timely, interesting and well written book by a sociologist who has already done good service to public health with his "Social factors in medical progress" and his "Should we be vaccinated?", 1927. It is thoroughly documented, but in the prevailing and annoying fashion which arranges the notes by chapters at the end of the book. To find a reference one must first search for the number of the chapter one is reading. Also it is distressing to see Tom Hood's body-snatching masterpiece, "Mary's ghost", 1827, referred to on p. 181 as the "doggerel" of a "contemporary rhymester" of 1765.

Occupational Diseases, Diagnosis, Medico-legal Aspects and Treatment. R. T. Johnstone. 558 pp., illust. \$8.50. McAlinsh, Toronto, 1941.

This book is a timely and authoritative source of information on occupational diseases. To write a textbook in the field of industrial medicine, and particularly industrial toxicology, is a rather discouraging task because of the rapid changes in industry which result in the continuous introduction of new and potentially hazardous materials. A textbook of industrial poisons grows out of date quickly. Even this book, as it is issued, is out of date with respect to the hazards of the explosive industries for one finds only the briefest reference to trinitrotoluol and no mention of the azides, tetryl or other materials which are troubling workers in this field.

Considerable space is devoted to workmen's compensation and the rôle the physician plays in connection with this type of legislation. Most space is given, however, to a discussion of the industrial poisons and dusts. But even in these chapters the relationship of these conditions to compensation is constantly stressed and illustrated by many individual cases. One can, indeed, differentiate this book from practically all other books on the same subject by its accent on compensation. The author's experience appears to be rather unique in this respect, since it embraces both medical and surgical cases.

Any criticisms which might be made are rather trivial in nature. The chapter on cadmium poisoning might well have included a reference to non-industrial cadmium poisoning from cadmium-plated cooking utensils which appears to be increasing in incidence. The discussion on lung cancer is very brief and no reference is made to the famous cancers in miners at Schneeberg and Joachimstal. Some of the causes of rejection for work, given in the chapter on pre-employment examination might well be disputed. For example a man with 20/200 vision in both eyes with or without glasses is to be rejected. Even the army, which is notoriously critical, will take these men. Perhaps the weakest point of all in the book is the lack of references to European literature. Dangerous trades were recognized and described in Europe before America ever thought of them and much fundamental research has been carried on across the water.

In general, however, it is the reviewer's opinion that the book is probably the best on the subject now available.

BOOKS RECEIVED

The Study of Man. L. J. Henderson. 22 pp. \$0.25. University of Pennsylvania Press, Phila., 1941.

Complete Weight Reducer. C. J. Gerling. 246 pp. \$3.00. Harvest House, New York, 1941.